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Effects of Administrator Implemented Homogeneous and Heterogeneous Grouping on Reading Achievement of Selected Sixth-Grade Students

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EFFECTS OF ADMINISTRATOR IMPLEMENTED HOMOGENEOUS AND HETEROGENEOUS GROUPING ON READING ACHIEVEMENT OF SELECTED SIXTH-GRADE STUDENTS

A Dissertation

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

by

Jerry L. Thacker

August 1987

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ABSTRACT

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by

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Chairman: Bernard M. Lall, Ph.D.

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

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School of Education

Title: EFFECTS OF ADMINISTRATOR IMPLEMENTED HOMOGENEOUS AND HETEROGENEOUS GROUPING ON READING ACHIEVEMENT OF SELECTED SIXTH-GRADE STUDENTS

Name of researcher: Jerry L. Thacker

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Problem

A Nation at Risk reported that the average achievement score of high-school students on most standardized tests is lower now than it was a quarter of a century ago, and the majority of the brightest students fail to achieve according to their ability. A salient problem in educating pupils is that of attaining reading comprehension achievement scores comparable to their intellectual potential.

This study examines the effects of administrator implemented homogeneous and heterogeneous grouping on the reading achievement of selected sixth-grade students.

Method

This was a quasi-experimental study using parametric techniques. The tests for hypotheses were analysis of variance, analysis of covariance, and multiple linear regression. This study compares the reading comprehension achievement of an experimental group and a control group. It also compares the interaction of gender as a factor in reading achievement due to instructional grouping techniques.

There were 113 sixth-grade students in the experimental group and 59 students in the control group.

Results

Nine hypotheses were tested for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. Reading achievement was not affected to a statistically significant degree at alpha = .05 by either instructional approach--homogeneous or heterogeneous--regardless of reading group ability level.

Hypotheses applicable to both high-ability and average-ability students exposed to homogeneous instruction found no significant differences related to gender. However, low-ability female students scored significantly higher than low-ability male students.

Hypotheses applicable to both high-ability and low-ability students exposed to heterogeneous instruction found no significant differences related to gender. However, average-ability male students scored significantly better than average-ability female students.

Conclusions

Academic performance, as measured by sixth-grade reading scores, was not affected to a statistically significant degree by the instructional approach--homogeneous or heterogeneous--regardless of reading group ability level.

Although there was a degree of inconsistency in regard to gender, average-ability male students tended to perform better in reading classes when exposed to heterogeneous instruction and low-ability female students tended to perform better in reading classes when exposed to homogeneous instruction.

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CHAPTER I

INTRODUCTION

The public school systems in the United States are currently under much scrutiny and are subject to increased accountability in the process of educating American citizenry.

A Nation at Risk (1983) has renewed the vigor and attention that American schools received during the post-Sputnik era. The National Commission on Excellence in Education, which was created by Secretary of Education T. H. Bell on August 26, 1981, conducted a definitive study on the nation's schools. Among the documentation that they published was the fact that "over half the population of gifted students do not match their tested ability with comparable achievement in school" (p. 8). Among the recommendations made were: (1) "The time available for learning should be expanded through better classroom management and organization of the school day," and (2) "Placement and grouping of students, as well as promotion and graduation policies, should be guided by the academic progress of students and their instructional needs, rather than by rigid adherence to age" (pp. 29-30). In order for schools to provide educational excellence "at the level of the individual learner, it means performing on the boundary of individual ability in ways that test and push back personal limits, in school and in the workplace" (p. 12).

The U.S. News and World Report magazine article "What Makes Great Schools Great" (Solorzano, Hogue, Peterson, Lyons, & Bosc, 1984) examined the profiles of the leading high schools in America. One principal stated that there was as much emphasis placed on the lower level student as on the gifted student. Another effective ingredient for academic excellence was that of maintaining high expectations for scholastic achievement.

Mastery learning and the use of multi-age student teams are credited with bringing recognition for outstanding achievement to the Harry L. Johnson Elementary School in New York. The Instructor article "A+ Schools: Portraits of Schools That Work" (May 1984) cites the practice of flexible grouping to meet individual needs as a major contributor to such a successful program.

The size of classes is another factor which is being analyzed in the primary grades in Indiana public schools. The State Legislature, influenced by Governor Robert Orr, introduced a program entitled Prime Time. This program was implemented in and restricted to first grade for the 1984-1985 school year. It has a student-teacher ratio of 18:1 as a class size average for every participating school corporation. The program is to be expanded to second grade in 1985-1986 and third grade in 1986-1987.

The National Association of Elementary Principals (NAESP) recognized the importance of elementary education and in September 1983 undertook the task of developing standards aimed at identifying factors which make an elementary school successful. Their indicators of quality are based on research which helped NAESP arrive at certain basic conclusions. Standards for Quality

Elementary Schools (1984) lists these following indicators of a quality school:

1. The grouping patterns within the school allow for learning at individual levels of need (but not on a track basis). Students may move from group to group, depending on the educational purposes to be served; grouping patterns do not lock students in. (p. 3)

2. While class size alone is not the determining factor, research shows that more learning takes place when classes are small and are combined with the use of varied teaching styles. Despite the financial implications demanded by lower class sizes, the practical experience of principals strongly supports efforts to encourage maximum class sizes that are even lower than the recommended 20 students to one classroom teacher. (p. 3)

3. Teachers believe all students can learn and expect them to succeed. (p. 13)

4. Teachers use a variety of instructional grouping patterns, ranging from whole class to one-to-one instruction. (p. 13)

5. Teachers continually diagnose academic needs and prescribe appropriate educational activities for individual students, considering learning styles and rates of learning. (p. 13)

6. Teachers identify students with special needs and provide appropriate support. (p. 13)

7. Teachers use a variety of classroom management skills to create an orderly and comfortable classroom environment, conducive to learning. (p. 13)

8. Children have healthy, positive self-concepts that enable them to feel successful academically, personally, and socially. (p. 11)

With such emphasis being placed on academic achievement, especially in reading and mathematics, it is imperative that schools examine and evaluate their instructional practices. It is inherent in the educational process that optimal learning conditions prevail.

With fiscal constraints a reality, school systems must endeavor to employ appropriate instructional grouping techniques for their students.

Statement of the Problem

The average achievement score of high-school students on most standardized tests is lower now than it was a quarter of a century ago. The majority of the brightest students fail to achieve according to their ability. Average verbal and mathematics scores showed a yearly decline from 1963 to 1980 on the College Board's Scholastic Aptitude Tests. Both the number and proportion of pupils exhibiting superior achievement have also declined. Approximately 23 million American adults are functionally illiterate, and today's tested achievement of college graduates has declined (A Nation at Risk, 1983).

Since reading entails cumulative skills, those students who have not mastered word recognition and comprehension skills will not experience satisfactory or significant academic gains. A salient problem in educating pupils is that of attaining reading comprehension achievement scores comparable to student intellectual potential. It is a challenge to the educational community to appropriately group students so that they may achieve to their greatest potential.

Purpose of the Study

The purpose of the study was to assess the effects of administrator implemented homogeneous and heterogeneous grouping on the reading achievement of selected sixth-grade students.

To examine this effect, nine areas were investigated:

1. The reading comprehension achievement of homogeneously grouped high-ability sixth-grade students and heterogeneously grouped high-ability sixth-grade students was compared.

2. The reading achievement of homogeneously grouped sixth-grade average-ability students and heterogeneously grouped average-ability sixth-grade students was compared.

3. The reading achievement of homogeneously grouped sixth-grade low-ability students and heterogeneously grouped low-ability sixth-grade students was compared.

4. The reading achievement of homogeneously grouped sixth-grade high-ability male and female students was compared.

5. The reading achievement of homogeneously grouped sixth-grade average-ability male and female students was compared.

6. The reading achievement of homogeneously grouped sixth-grade low-ability male and female students was compared.

7. The reading achievement of heterogeneously grouped sixth-grade high-ability male and female students was compared.

8. The reading achievement of heterogeneously grouped sixth-grade average-ability male and female students was compared.

9. The reading achievement of heterogeneously grouped sixth-grade low-ability male and female students was compared.

Importance of the Study

The importance of this study is that it supplies additional data about how administrator implemented grouping procedures influence achievement gains in reading comprehension. It makes an

effort to determine the optimum level of performance for each individual within a specified group by examining grouping strategies and their effect on students with different abilities and of different genders.

This study examined homogeneous and heterogeneous grouping procedures in schools and their effects on learning. The results should help school districts decide what above-average schools can do to further improve standardized scores. There may also be applications for various types of student populations and for grouping in other subject areas.

Delimitations of the Study

This study attempted to determine the advantages and disadvantages, in terms of relative student academic achievement, of grouping students in heterogeneous and homogeneous reading classes. It was delimited to a population of selected students in a northern Indiana school system who had been receiving reading instruction in their respective schools for a period not less than three consecutive years. The sixth-grade reading comprehension scores were compared to the intelligence quotients of the students, and an analysis of scholastic achievement scores was more relative to instructional grouping procedures.

The schools selected used homogeneous and heterogeneous grouping techniques, respectively, for reading classes. They were institutions which have historically scored above the national norm in reading comprehension. Because of this high standing, the

definition of high-, average-, and low-ability students may be slightly skewed toward the upper end of the continuum.

The student population is comprised almost entirely of white, middle-class students. Less than one percent of the students are minorities (i.e., Blacks, Hispanics, Oriental), and less than one percent are participants in the free and/or reduced price school-lunch program.

Theoretical Framework

Prinicipals in quality schools exhibit strong leadership. They inspire their teachers to become immersed in the school's mission and dedicated to its attainment. Through their attitudes and conduct they demonstrate the values and beliefs that are so critical to the school's operations and expectations. The principal in a quality school places highest priority on instructional leadership, creatively organizing the available human and material resources to provide an outstanding school program and inspire in students a lasting interest in learning. The principal is active in developing and implementing curriculum goals. The principal also works closely with teachers in determining instructional strategies (Standards for Quality Elementary Schools, 1984, p. 7).

It has been said by Secretary of Education William Bennett and by his predecessor Terrel Bell, and confirmed by numerous research studies, that the key determinant of a school's quality is the principal. There is further agreement that a key element in a quality school is the instructional leader's performance in assuring an excellent reading program (Honel, 1986).

For a school to attain its optimium level of performance in reading achievement, the instructional leader must creatively adapt methodology and strategies to the existing personnel. Lemon (1986) defined leadership as "Working with and through other people to achieve a particular goal." He stated that a principal needs to acquire an understanding of the different "styles" of leadership, and the conditions under which each might advisedly be practiced. For best results, administrators must become skillful in employing a range of differing leadership styles and applying the appropriate style to the demands of the particular situation.

This section endeavors to address leadership styles, leadership purposes and acts, personnel, occupational climate, and instructional grouping strategies. If an organization is to improve instruction, it is highly probable that the principal is the determining factor in change. It is the principal who must assess the instructional program and implement the type of educational learning system which will result in improvements (Schuster & Stewart, 1973, p. 66). Although the principal is the catalyst for change, Goodlad (1969, p. 8) stated that principals generally are rather unaware of the instruction going on in their schools and focus on the immediate day-to-day operations rather than on what they intend to ameliorate and accomplish in their schools.

The organizational pattern is a framework for planning instruction for the benefit of each student. Schools have made a number of attempts to revise existing patterns or to devise new ones in order to meet the needs of the pupils. The principal must select and accept appropriate techniques and ideas for the school, for not

one single pattern of instruction has been universally accepted (Schuster & Steward, pp. 70-71). Although students are generally divided into grades by virtue of their ages, most educators know this pattern does not fit all children. The concept of children progressing one year academically for each year of placement is not realistic if every child is to have his or her needs met. Two of the organizational patterns that have been implemented are the graded heterogeneous plan which groups a classroom of children with one teacher regardless of achievement or ability and the graded homogeneous plan which groups according to ability and achievement in relation to colleagues in the same age group (p. 73).

The astute administrator recognizes that one must deal with the organization, the individual, and the environment. The organization and the environment must work in harmony. The organization must establish and attain the goals desired by the environment, and the environment must support the organization that satisfies its desires. The individual and the organization must work harmoniously, too. The individual must accept and facilitate the achievement of the organizational goals and, in turn, the organization must satisfy the goals and desires of the individual (Morphet, Johns, & Reller, 1974, p. 68).

Jacob Getzels (1958, p. 151) conceived of administration as subordinate-superordinate relationships which were structurally formed in a hierarchy of the social system. The functional aspect involved an allocation and integration of roles and facilities to attain the social system's goals. He further promulgated that the social system involved the institutions with roles and expectations

which attain the system's goals and involved the individuals with personalities and need dispositions who function within the system. He termed the interaction as social behavior and called the interaction of institution, role, and expectation as the nomothetic or normative dimension of the social system. The individual, personality, and need-disposition together constituted the ideographic or personal dimension in the social system.

John Hemphill's (1958) definitions of attempted leadership, successful leadership, and effective leadership are:

1. Attempted leadership acts are acts accompanied by an intention of initiating structure-in-interaction for solving a mutual problem.

2. Successful leadership acts are acts that have initiated structure-in-interaction during the process of mutual problem solution. An attempted leadership act may or may not become a successful leadership act depending upon subsequent observation of its effect upon the structure of interaction.

3. Effective leadership acts are acts that have initiated structure-in-interaction and that have contributed to the solution of a mutual problem. An effective leadership act is always also a successful leadership act, but a leadership act may be successful without being effective for solving mutual problems. (p. 134)

Leadership must be exercised to effect desirable changes. Chris Argyris (1970, p. 164) observed that effective change occurred when changes were long-lasting, self-monitoring, and reinforcing of system competence and lead to further development. Such changes are most effective when a favorable climate has been created. Robert Howsam (1967, p. 72) stated that change should be approached in a manner that results in a climate conducive to continuous adaptation and change. Improvements in education are most likely to evolve

when the attitudes and expectations of educational personnel are favorable.

There exists the need for meaningful goals. The major responsibility of a leader is to assist and encourage the members of a group to reach meaningful goals. Effectively establishing goals produces positive results, and positive leadership generally results in higher job satisfaction and better performance (Davis, 1977, p. 111-112).

A leader's role is to influence people and frequently to effect change. Administrator implementation of instructional techniques and strategies is sometimes complicated by the fact that there is not a direct adjustment; instead there are responses by employees whose attitudes are conditioned by feelings. Such a relationship was illustrated in a number of experiments headed by F. J. Roethlisberger (1941, p. 21). In one experiment based on the premise that better lighting would result in greater productivity, the productivity did increase. Then when lighting was decreased to test the hypothesis that productivity would decrease, productivity increased further. Additional decreasing of lighting again resulted in greater productivity. The results indicated that lighting was not a causal effect but that results were largely due to employee attitudes. The attitudes of the personnel determine their responses to change and work situations. Their feelings are the result of their personal history, their background, and their social experiences outside the work setting. The environment is a second causal factor because it reflects the fact that group members exhibit a

sense of cohesiveness and are influenced by certain codes, patterns, and norms (Davis, 1977, pp. 158-160).

Davis (1977) suggested that the entire social system is affected through change: "its people, formal organization, informal organization operating environment, communication patterns, decision making, and patterns of cooperation" (p. 161). A group develops responses to pressures and changes in order to maintain equilibrium; thus, each pressure is faced with a counterpressure (p. 161).

Each individual in the organization has certain needs that he or she endeavors to satisfy within the framework of the occupational setting. When individual needs and organization demands are not compatible, problems surface which affect both parties--the individual and the organization. Unfortunately, such needs and expectations are rarely in total agreement. Disparity of agreement usually exists in both the individual and the organization (Castetter, 1976, p. 8). The process and procedure in which educational programs and systems are designed and implemented, from components to the total system, can affect the degree of cooperation of the members in attaining organizational goals (p. 8).

Although it is evident that numerous benefits can be derived from the goals established by the leaders of the organization, it is equally clear that attainment of such objectives and goals by the employees will not be realized unless said employees are committed to those objectives and goals. "Goal acceptance, commitment, and internalization are behavioral aspects involved in and essential to the outcomes of the goal-setting process" (Castetter, 1976, pp. 11-12).

Implementation of educational programs and structure of organizations are subject to the various philosophies and to the diversity of the people who are employed as educators in the nation's schools. Some perceive the goals of education in agreement with John Dewey, who emphasized the development of critical-minded individuals whose interests are creative in nature and to work for the improvement of society. Others are proponents of the ideas of Adler, Hutchins, and Martain who favored intellectual development through neohumanistic assumptions. Still others espouse "essentialism, realism, reconstructionism, or the laissez-faire values of Bousseaw" (Castetter, 1976, pp. 13-15).

Some important functions of the administrator cited by Castetter (1976) are to recognize the existence of such diverse ideologies among the teaching members of the organization to anticipate conflict over philosophical issues, to develop strategies to accommodate different philosophies, and to work toward an ideological "mix" which allows for effective school operations (p. 15). Such a plan can link positions and people to purposes, such as utilizing certain grouping strategies and techniques in appropriate schools in order to achieve optimum opportunities for education excellence. "Applying the best methods and techniques that exist with respect to organization structures can be construed as technical rationality" (pp. 15-17).

Campbell, Cunningham, McPhee, and Nystrand (1970) cited Lipham's contention that the distinction between administration and leadership is that administration moves the organization in its customary direction and leadership changes the goals or procedures

in the organization. Such a distinction does not preclude an administrator from being a leader, but implies that administrators generally try to maintain their organizations.

Administration is clearly instrumental to the teaching and the learning of the pupils in the schools. The administrator is considered productive only when he or she initiates viable instructional programs and motivates the staff. Halpin and Croft (1963) described the climate of schools on a continuum from "open" to "closed."

> The open climate describes an energetic, lively organization which is moving toward its goals, and which provides satisfaction for the group members'social needs. Leadership acts emerge easily and appropriately from both the group and the leader. The members are preoccupied disproportionately with neither task achievement nor social-needs satisfaction; satisfaction on both counts seems to be obtained easily and almost effortlessly. The main characteristic of this climate is the 'authenticity' of the behavior that occurs among all the members. (pp. 2-3)

The other end of the continuum describes the closed climate as follows:

> The closed climate is characterized by a high degree of apathy on the part of all members of the organization. The organization is not 'moving'; Esprit is low because the group members secure neither social needs nor the satisfaction that comes from task achievement. The members' behavior can be construed as 'inauthentic'; indeed, the organization seems to be stagnant. (p. 3)

In the Halpin and Croft study, the principal's behavior appeared to be critical in the open climate, where such environments provided more effective teaching of knowledges, attitudes, and

behaviors than closed climates. The administrator provided much motivation through his or her own actions and by example (pp. 245-246).

Alfonso, Firth, and Neville (1981) wrote about a number of leadership styles which are often used in instructional supervision. They cited research efforts by Lewin, Lippitt, and White and another by Bavelas which evidenced different patterns of achievement and group emotional climates of employees operating under different leadership styles. Other work by White and Lippitt found that autocratically led groups produced slightly more work, but exhibited less motivation, more aggression and discontent, and a greater dependency need. Laissez-faire leadership produced less work, more play, poor motivation, and much discontent among workers. Democratic leadership styles seemed conducive to slightly less work but of higher quality, more originality, and workers who were more highly motivated and group minded. Authoritarian leadership was most effective under good leaders who were highly competent; in fact, such leaders were considered to be the most successful by researchers, while authoritarian leaders who were low in competence were judged to be the least successful type of leaders (pp. 100-101). However, in another study by Lippitt of group atmosphere in democratically and autocratically led groups, he found that the democratically led group was more likely to continue its normal work pattern when the leader was absent, whereas, the autocratically led group tended to stop work and wait (p. 102).

Leadership styles are more effective when they match the peculiar characteristics of a given situation. Situational leadership theory is predicated on the premise that it must change as the situation changes. Hersey and Blanchard (cited in Alfonso et al.,

1981) believe that successful leaders adapt their behavior to the requirements of the environment and circumstances. They consider the maturity of the subordinate as the salient characteristic on which to select a specific leadership style. Maturity was defined as the ability of the subordinate to assume responsibility, as having high but realistic goals, and having extensive education and/or experience. Hersey and Blanchard then recommended that emphasis shift from task to relationship-oriented behavior as the maturity of subordinates increased (p. 105).

Effective and successful leaders must assess the attitudes and needs of the teachers and students and implement appropriate instructional programs in their respective schools which enable them to attain the goals of the organization. A model for matching environments to people needs to be examined prior to changes in instructional programs. The model may need to be concerned with the content of personality development, the content of a person's social and political values, and the structure of the system. Individuals relate to their environment on a continuum ranging from relatively few dimensions which are not well integrated with each other to many dimensions which are highly integrative (Joyce & Weil, 1972, pp. 297-300).

There are three important tasks relative to the conceptual systems of teachers and students. The first discriminates persons according to particular levels of development (high to low). The second involves the creation of an environment which matches the complexity of the personnel and students. The third includes environmental prescriptions which are utilized to increase the

integrative complexity of the individual (Joyce & Weil, p. 306). The different performance levels of individuals who differ in conceptual complexity in various situations make the task of matching the environment to the students' complexity a challenge for educators (p. 307). Whenever the curriculum and instruction are harmonious, the influence and impact of the environment can be considerable. The educational programs can vary a great deal in kinds and complexities but generally may be found in the following areas (pp. 319-320):

1. Kinds of curricula and functions of curricular design.

2. Selecting educational missions and relating them to models of teaching.

3. Using the models of teaching to select educational means.

The models of teaching serve two primary functions: (1) clarification and identification of educational ends, and (2) objectivity and guidance in the selection of appropriate means to achieve those ends. Together, the curriculum and instructional means are the medium for learning (Joyce & Weil, pp. 321-322).

There are several facets to the grouping procedures within the elementary schools. Forming instructional groups is an important aspect in the education of the students. Two basic grouping procedures are examined: heterogeneous and homogeneous grouping plans.

Heterogeneous instructional groups or classes are formed when there is no single factor which determines group assignment. Homogeneous instructional groups or classes are formed on the basis of a single factor or multiple factors. This is called ability grouping when intellectual maturity is the single factor or controlling factor which determines group assignment (Ragan & Shepherd, 1971, p. 150).

Grouping procedures are likely to differ from one school to another. Heterogeneous grouping practices generally recognize chronological age as the primary determiner of entry. Chronological age and years in school are the major factors upon which the child is placed in a group or grade. The heterogeneously graded school has identified a body of skills and knowledges and placed them in a set sequence of grades. As a result of these grades, textbooks and materials are assigned to those respective levels. Decisions regarding movement to another group are generally reserved until the end of the school year. Promotion is dependent upon the students successfully completing the academic work for that grade level. The work assigned to each grade is usually given to all of the students within a specified grade level (Ragan & Shepherd, 1971, p. 136).

Dissatisfaction with such a system exists due to the increasing amount of information about the wide range of differences that exist among students in any given grade level. The difference in intellectual age among first-grade pupils usually shows a range difference of about four years; sixth-grade pupils in a given class generally have a range of about five or six years in differences. This results in having teachers instruct students who are not ready for grade level work and others who are well above grade level both having to do assignments designed for their grade levels (Ragan & Shepherd, 1971, pp. 136-137).

The philosophy of continuing growth, which advocates that children should be assisted in learning in their natural patterns, is increasingly being accepted. Thus, the slow-learning child is able to learn without having to meet unattainable goals, and the bright

student is able to learn as much as his or her ability and motivation permit. Heterogeneous grouping in self-contained classrooms tends to lead to instruction aimed at the average student (Ragan & Shepherd, 1971, p. 142).

Advocates of such a plan claim:

1. Heterogeneous grouping typically occurs in self-contained classrooms. Such classrooms call for the placement of children with a teacher for a major part of the instructional day. This enables the teacher to learn about the student through much contact and to see him or her in a wide range of learning activities.

2. The teacher is able to offer more interrelated study of subject matter.

3. Pupils are able to participate in group experiences because they stay with the same group and teacher for most of the day.

4. Regular classroom teachers can generally acquire the depth and knowledge of the subject matter required in the elementary schools. The understanding of child development and the ability to organize learning experiences are also important for elementary teachers.

5. Classroom plans can be modified to permit teachers to exchange classes with other teachers in order to teach subjects in which they have greater expertise.

Opponents of such a plan claim:

1. Pupils need experiences with many teachers.

2. Teachers may neglect to teach the areas in which they lack competence.

3. Teachers tend to become isolated rather than work with their peers as a team.

Homogeneous grouping is an endeavor to form instructional groups composed of students who have similar enough traits or characteristics to warrant group instruction and a reduction in the task of providing instruction which is adapted to individual differences. Such a plan is commonly used in schools with large student populations and several teachers at every grade level. The purpose is to assign students to various teachers on the basis of ability to learn. Measures of intelligence, achievement test scores, and special abilities are frequently the bases for grouping pupils (Ragan & Shepherd, 1971, p. 150).

Advocates for homogeneous grouping claim:

1. The teacher who has a group of abler pupils can challenge these pupils to work up to their capacity by using more difficult materials, expecting these pupils to progress more rapidly from one level of difficulty to another, and requiring a higher level of performance.

2. The teacher who has a group of less capable pupils can gear the instruction to their level of ability by using easier materials, giving them more time to progress from one level of difficulty to another, and setting more realistic standards for performance.

3. Differentiated instruction in terms of ability and effort enhance equality of opportunity for pupils with wide variations in ability.

4. Parents, especially those whose children are in the upper ability group, generally favor the plan.

5. Teachers, who are inclined to hope that some plan will be found to give them a group of pupils who are somewhat alike in ability, generally favor the plan.

6. It is more true to life to have pupils compete with those who are somewhere near their own level of ability; slow pupils particularly have better opportunities to become leaders in their own groups.

7. Teachers have an opportunity to do a better job of teaching the skill subjects when the pupils in their classes do not vary so widely in ability.

8. The teacher has a better opportunity to work with individuals when the range of ability in the class is reduced somewhat.

Opponents of homogeneous grouping claim:

1. Grouping pupils into high, average, and low groups does not significantly reduce variations among pupils in these groups: teachers must still provide differentiated instruction within these groups.

2. The plan does not accomplish the purpose of providing instruction for each pupil according to his or her ability unless materials are provided for each group that are suitable for pupils of that general level of ability; this is not always done (Ragan & Shepherd, 1971 p. 351).

Since there is not universal agreement on administrator implemented instructional strategies, there needs to be further

examination of the results relative to academic achievement. Recognizing the complexities of human behavior, the influence of environment, and the integration of the two, educational leaders must search for the most productive means to educate today's youth.

Statement of Hypotheses

Nine hypotheses are stated here, consistent with the purpose of this study and the statement of the problem. The same hypotheses are later stated in the null form for the purpose of testing and analysis.

1. Homogeneous grouping techniques affect the reading comprehension achievement of high-ability sixth-grade students.

2. Homogeneous grouping techniques affect the reading comprehension achievement of average-ability sixth-grade students.

3. Homogeneous grouping techniques affect the reading comprehension achievement of low-ability sixth-grade students.

4. Homogeneous grouping techniques affect the reading achievement of high-ability male and female sixth-grade students.

5. Homogeneous grouping techniques affect the reading achievement of average-ability male and female sixth-grade students.

6. Homogeneous grouping techniques affect the reading achievement of low-ability male and female sixth-grade students.

7. Heterogeneous grouping techniques affect the reading achievement of high-ability male and female sixth-grade students.

8. Heterogeneous grouping techniques affect the reading achievement of average-ability male and female sixth-grade students.

9. Heterogeneous grouping techniques affect the reading achievement of low-ability male and female sixth-grade students.

Definition of Terms

For the purpose of this study, the following terms have been defined:

Student - The student is one who has received reading instruction in the same school for a minimum of three consecutive years. He or she is a sixth-grade student.

Reading Instruction - Reading instruction consists of instruction in comprehension, vocabulary development, and syllabication.

Heterogeneous Groups - Webster (Webster's New World Dictionary, 1967) defines heterogeneous as ". . . composed of unrelated or unlike elements or parts; miscellaneous . . ." For purposes of this study, heterogeneous groups consisted of the grouping of high-ability, average-ability, and low-ability students.

Homogeneous Groups - Webster (Webster's New World Dictionary, 1967) defines homogeneous as ". . . composed of similar or identical parts, uniform . . ." For purposes of this study, homogeneous groups consisted of the respective groupings of the following three classifications: (1) high ability, (2) average ability, and (3) low ability.

High-Ability Students - High-ability students are those who scored at or above the 80th percentile on intelligence tests published by Science Research Associates.

Average-Ability Students - Average-ability students are those who scored between the 40th and 80th percentile on intelligence tests published by Science Research Associates.

Low-Ability Students - Low-ability students are those who scored at or below the 40th percentile on intelligence tests published by Science Research Associates.

Intelligence Quotients - The Educational Ability Series (EAS) from Science Research Associates, Inc., was used to measure the ability of the students. The test measured verbal, number, and reasoning abilities. The EAS quotient scale is a standard-score scale with a mean of 100 at Kindergarten level that increases by 0.5 each grade year until the end of grade 10. The standard deviation is 16. Percentiles range from 1-99.

Achievement Test Scores - The tests published by the Science Research Associates, Inc., (SRA) were used for measurement and evaluation of reading achievement. The tests were standardized, which means that specific instructions for administering the measurement instrument were used. Tests were subjected to controlled scoring procedures which made norms available so that the performance of a student or group can be compared with that of an appropriate sample, usually nationwide (SRA Achievement Series User's Guide, 1973, p. 5).

Growth Scale Values - Growth Scale Values are numeric scales, one for each subject-matter area, that provide continuous measurement of student performance. They are standard scores,

represent equal increments, and have the same meaning at any point on the scale. For purposes of this study, growth scale values were used to compare a student's performance in relation to the others in the national group. Growth scale values run from 20 to 780, and provide continuous measurement of student performance (SRA Achievement Series User's Guide, 1978, p. 15).

CHAPTER II

REVIEW OF RELATED LITERATURE

History of Grouping

The implementation of the graded school occurred in the New Quincy Grammar School of Boston in 1848, which initiated a revolutionary innovation in American schools. This school was under the direction of principal John D. Philbrick and graded instruction was proffered by twelve assistant teachers in twelve separate classrooms. Although grading was controversial and instituted in city schools first, by 1900 it was also the instructional practice of the rural schools, too (Noble, 1955, p. 205).

Ability grouping evolved from the graded schools in Elizabeth, New Jersey, and St. Louis before 1900 and was widely used in Detroit in 1919. Such grouping practices increased in popularity during the next two decades but sharply declined in use during the 1940s and 1950s. From their inception, ability-grouped classrooms have been controversial with proponents and critics respectively espousing benefits and shortcomings (Petersen, 1964, pp. 361-362).

Advocates of ability grouping believe that teachers have fewer individual differences to contend with in homogeneous classes; therefore, they are enabled to offer more appropriate instruction (Cook & Doll, 1974, p. 168). Opponents denounce such

practices because they endanger self-concepts of those not in high groups, yet do not engender better learning (Petersen, 1964, pp. 364-365).

In the subsequent years numerous studies have been conducted related to heterogeneous and homogeneous instructional groupings. Those studies have included factors related to grouping such as socioeconomic backgrounds, race, gender, and ability. An analysis of ability grouping by Alexander, Cook, and McDill (1978) agreed that socioeconomic status affected group assignment. Wilson and Schmit (1978) found that a majority of teachers and administrators favored utilizing ability groups for instructional purposes.

Criteria for Placement in Groups

Marcus (1979) reported that teacher observations, intelligence scores, past achievement, and scores on reading comprehension tests were bases for grouping students. One study (Moore, Martin, & Mundy, 1982) of first-grade pupils who were placed into reading groups based on their scores on the Metropolitan Reading Test appeared to have fulfilled a prophecy based on predictive validity.

Such early identification and small group instruction were recommended in order to encourage gifted children to read widely, creatively, and critically (Brown & Rogan, 1983). Criteria for identification and placement included teacher judgment and observations (Rist, 1970). Ethnicity and socioeconomic status often influenced group assignments, according to Heyns (1974). Taylor (1971) advocated considering personality and motivational factors when assigning students to instructional groups.

Barr (1975) studied teachers and their first-grade pupils in schools that differed considerably in socioeconomic status and student population, but were somewhat close in size, teacher training, and experience. She found that in one school grouping was based on reading readiness for basal readers, but the classes were given instruction as a whole in phonics and structural analysis. Another school used grouping for both reading and phonics. The decisions to group were influenced by availability of materials and teacher values. Use of groups was also affected by class size, in which smaller classes were initially instructed as a total class.

The claim of ethnic bias on most intelligence tests indicates an unfairness toward ability grouping (Amato & Backman, 1979). The concept of fairness, since the advent of desegregation in many U.S. schools, has resulted in arbitrary grouping, based on birthdate or alphabetical order, as an avenue to supplant ability grouping (Guthrie, 1979).

Wiesendanger and Birlem (1979) found that once children were assigned to reading groups they usually remained with those particular groups. Factors related to such stability of groups were time constraints on the teachers to assist students to catch up with their peers if the pupils have moved into a higher group. Social groups may also be disrupted when students moved from one group to another. Further, any downward movement has, at times, been met with some resistance by students and parents (Hallinan & Sorensen, 1983).

Weinstein (1976) focused on teacher behaviors and reading group membership of students in the first grade. Data analysis showed that by the end of September, all teachers had identified three reading groups in their classrooms. Mobility of student assignments affected approximately 35 percent of all students from October through January. Nearly one half of all students had been reassigned during the first month. Girls tended to be more upwardly mobile than boys, and middle-reading group students tended to move more often. Further, upward mobility for low-ability students seemed to be restricted to the middle group. Ultimately, to provide a solution for reading problems, Levine (1979) recommended the use of ability grouping in the schools.

Instructional Methods for Groups

An investigation of instructional methods by Rist (1970) and Brophy and Good (1970) revealed that teachers gave low groups fewer response opportunities and tended to spend more time with students for whom higher expectations were held. At the same time, teachers tended to offer more warmth and praise to students of higher ability.

Miller and Hering (1975) stated that research showed that teachers prefer to teach the better readers. This research may be crucial to educating children since Artley (1981) believes that the teacher has the greatest effect on academic achievement. Waltman (1979) found that teachers overwhelmingly support the use of ability grouping.

In one study teachers reported positive attitudes toward grouping but were concerned about possible negative student attitudes and discipline problems (Seltzer, 1976). Analysis of the effects of teacher expectancies revealed that low-ability students were particularly affected by high-prejudice teachers (Aron, 1976). Teacher attitudes may be affected by ability grouping and they may depress the morale of students placed in lower-ability groups (Secord, 1967).

A study diametrically opposed to earlier contentions that high-ability students received more instruction was conducted by Streeter and Kidder (1977). They found the distribution of resources to be of varying degrees: with low-ability pupils receiving more instructional time than average- and high-ability students, especially when instruction was offered by a specialist or an aide.

Broaden (1980) also found that low-ability students received more instructional time from teachers. High-ability students generally spent more time working independently than pupils in lower groups.

Observations by Haskins, Walden, and Ramey (1983) revealed that teacher and student behaviors were varied in high- and low-ability groups in heterogeneous settings. High-ability students were offered more individual work in this study of kindergarten and first-grade students than were low-ability students, who received more instruction as a group. More positive reinforcement, more drill and error correction, and more control statements were utilized with low-ability students. They also received more direct

instruction from the teachers and were more disruptive and more frequently off task than high-ability students. Further, more instructional time was spent by teachers with low-ability pupils.

Stern and Shavelson (1981) reported that teachers' plans for low-ability reading groups included more procedures, decoding, basic comprehension skills, and highly structured assignments. High-ability students were allowed more flexibility in procedures and assignments, and more sophisticated comprehension skills were emphasized in this study of a combination fifth/sixth-grade classroom.

Heathers (1967) supported the notion that high-ability students received more supplementary materials and instruction which emphasized individual projects and conceptual learning, whereas basic facts and drill work were used for low-ability students. Borko, Shavelson, and Stern (1981) implied that differences in grouping decisions lead to differences in the pace of instruction and that pace seems to be associated with differences in student achievement. The use of a highly structured format for teaching reading to a low ability group and a reasonably unstructured lesson for a high-ability group can lead to very different instructional practices and effective learning situations for the pupils.

Wiesendanger and Birlem (1979) found that a high proportion of children in the primary grades were taught through the basal reader approach. Additionally, the vast majority of students were assigned to high, medium, or low groups. These variations were valuable because the immediate needs of the child were met and

students were not forced to waste time in groups which were not valuable. They suggested that groups should remain flexible to allow for creativity and innovative techniques.

Hiebert (1983) cited studies by Weinstein (1976) and Alpert (1974) which reported that low-ability students are placed in smaller groups than higher-ability children and receive more teacher contact time. Russo (1978) stated that the use of small reading groups with classroom settings provided children with a sense of security when they were all on the same reading level. Bodine's (1977) examination of cognitive styles, task structure, and task settings on student outcomes suggested that the utilization of small groups increases student satisfaction and, for some students, an increase in achievement.

A study by Furno and Collins (1967) found significantly greater achievement gains were recorded by students in smaller classes than those students in larger classes in regular and special education curricula. With low-ability classes frequently being smaller than other ability classes, Sweet and Canady (1979) cited many benefits for such students:

1. Teachers employ more instructional strategies, methods, and learning activities and in a more effective manner (Newell, 1943; Richmond, 1955; Whisitt, 1955).

2. Pupils gain from additional individualized instruction (Hare, 1962; Danowski, 1965; Edwards, 1969).

3. Mastery of more subject matter occurs and basic skills are learned (Balow, 1967; Furno, 1967; Walberg & Rasher, 1974).

4. Discipline improves (Richmond, 1955; Hubbard, 1963; Cannon, 1966).

5. Positive teacher attitudes develop (Hubbard, 1963; Cannon, 1966).

6. Positive student attitudes develop (Eash & Bennett, 1964; Applegate, 1969; Bolander, 1973).

Effects of Grouping On Attitudes and Self-Concepts

Student attitudes toward learning and school and their self-concepts have long been considered strong factors in academic achievement. As a result, the grouping practices of the educational environment can influence the intellectual stimulation and development of the learners.

Kulik (1982) discovered that the effects of grouping on student attitudes toward learning were even more striking than the effects of grouping on student achievement. The effects on attitudes toward school and self-concepts were found to be positive. The effects of homogeneous ability grouping on sixth-grade students strongly indicated that such students were more highly motivated than students in heterogeneous classes (Atkinson & O'Connor, 1963).

Findings by Penna (1976) revealed that instructional approaches in literature affected ego identity of ninth- and tenth-grade students. The high reading group scored significantly higher on ego identity than did the average- and low-reading achievement groups.

Gifted second-grade students manifested more favorable attitudes toward school when they were placed in interage groups

(Runyon, 1963). Low-achieving second-grade pupils who were assigned to homogeneous groups exhibited more positive self-images and attitudes toward reading than high-achievers, even though they had significantly less reading ability and were able to read almost nothing. The fact that the low achievers were the best readers in their groups produced such positive affective results. It was concluded that classroom status as a reader and not actual reading ability influenced attitudes (Kibby, 1977).

Butner (1976) conducted a comparison of self-concepts and school attitudes of third-grade low achievers in homogeneous and heterogeneous groupings. Students appeared to exhibit positive attitudes toward school when in homogeneous groups. Social status was also affected by ability grouping. Fifth- and sixth-grade boys were accorded academic status on the basis of teacher perceptions of pupil academic ability and pupil-accorded academic status. Boys who gained more status in the classroom were also granted more social status (Schuncke, 1978).

The importance of reading success was inculcated upon students as early as first grade. Bayer (1981) investigated the cultural scene of a first-grade classroom and was in accord with Barone (1976) about his contentions that children tacitly learn that reading is the most important academic discipline, that reading groups reflect the student's skill, and that reading is used to achieve certain objectives and is not primarily for enjoyment. As a student ascends or descends reading groups, his social status is reflected in the hierarchy. The students who are in higher reading

groups enjoy more social status, and those who are assigned to lower reading groups enjoy less social status.

Schluck (1977) wrote that students' perceptions of their group membership (high, middle, or low) affected their reading achievement. Students who had been placed in a high group scored better and reflected positive attitudes. Students who thought they had been placed in a low group performed more poorly on reading tests and expected to do less well in future reading work.

Within a group, the relative standing of a student in comparison to his classmates on certain behaviors may be more important than the actual amount of praise or criticism that the pupil received (Martin, Veldman, & Anderson, 1980). Third-grade students showed significant increases in self-concepts when they were moved to higher reading groups in their within-class grouping situations (Wonsiewicz, 1977). The effects of segregating or mainstreaming of educable children revealed no significant differences when self-concepts were measured (Gerke, 1976).

Curriculum placement in the Kibbutz (Nachmias, 1980) evinced no adverse effects on students, and tracking had no detrimental impact on interpersonal relations. Student interaction was found to cross tracks, and vocational students associated with academic students and exhibited no feeling of inferiority.

Not all research has supported the use of ability grouping because there was evidence contrary to the aforementioned studies. A review of research conducted by Esposito (1973) between 1960-1972 indicated an impairment of attitudes and self-concepts of children with low ability when placed in ability groups.

Another review of previous research of ability grouping showed that most studies (Cowles, 1977) suggested a certain social stigma for students who were placed in low-ability groups, although one study found that students who were placed in homogeneous low groups had higher feelings of self-worth. The studies concluded that students were aware of grouping, even in heterogeneous classes, and that peer acceptance was greater in heterogeneous classes. Homogeneous groupings appeared to be the most beneficial to pupils assigned to high groups. Homogeneously grouped pupils also tended to demonstrate a more favorable adjustment to other children and schoolwork than heterogeneously grouped students.

A study by Levenson (1973) revealed that ability grouping in the teaching of reading reinforced negative self-concepts and negative attitudes toward reading. Furthermore, ability grouping, Zweibelson (1967) suggested, may produce not only negative school and learning attitudes but reduce the motivation of able students. His study found that students who were grouped in high-ability classes tended to exhibit more negative attitudes toward school and learning and to show lower motivation levels than students who were in low-ability classes.

Only about 3 percent of all teachers surveyed expressed a preference for teaching low-achieving groups in ability classes. They stated that there was a lack of peer stimulation toward achievement; therefore, such groups fulfilled their teachers' worst expectations. With grouping following socioeconomic lines, the high-ability students experienced significant gains, but lower-ability students became stigmatized and unteachable in their own

eyes, as well as the instructors'. Additional research on attitudes showed that the assignment to a low-ability reading group had a strong negative effect on the attentiveness of students in first-grade classes. Peer influence and teacher expectations appeared to be possible causal factors on such behavior (Felmlee & Eder, 1983).

Effects of Grouping on Achievement

Since students, teachers, and administrators have been indoctrinated with the importance of academic achievement, homogeneous groupings have been utilized to accomplish that objective. Homogeneity of classrooms has been used to better meet the instructional needs of all students; however, Goldberg, Passow, and Justman (1966) concluded that research did not support the practice of homogeneous grouping. They found that there was no obvious positive or negative effect on the average academic achievement of ability-grouped children. Although the high-ability groups made gains, the average- and low-ability groups showed significant losses (Findley & Bryan, 1970).

Diametrically opposed to Findley and Bryan's study, Justman (1967) reported that low homogeneous classes showed greater growth than average or high classes that were ability-grouped for reading. Newport News Public Schools published an article ("Effects of Grouping Disadvantaged Children for Reading Instructions in Grade 1", April 1970) on disadvantaged first- and second-grade students which reported significantly improved chances for progress when they were grouped for special instruction.

Tape-recorded interviews revealed that teachers' choices of organization of reading classes for six-year-old students in Belfast, Ireland, affected academic achievement. Students who received instruction in ability groups were found to have higher mean reading ages in high, average, and low groups than pupils who were taught individually. A significant difference was found for bright pupils in this study (Sandby-Thomas, 1983).

Bennet and Ogletree (1976) discovered that neither homogeneous nor heterogeneous grouping had any significant effect on reading achievement of slow learners at the first-grade level. Differences that did occur, however, were that the means of the homogeneous group were higher than the heterogeneous group and that slow learners in the former group tended to show higher achievement in reading readiness than their counterparts. Intermediate remedial students in groups consisting of white, black, and Puerto Rican boys and girls significantly gained in reading achievement when in homogeneous groups (Kelly, 1972).

Cross-level grouping of middle-school underachievers in reading instruction led to significant mean gains for students in Grades 4 and 7, nearly significant gains in Grade 8, and nonsignificant gains in Grades 5 and 6. The use of such grouping patterns were more likely to lead to gains when used than when not used (Chrismar, 1973). Mildly learning disabled students achieved significantly higher in reading in a self-contained special learning disabilities classroom than did students in regular classrooms with the outside support of a specialist and over learning centers for the learning disabled (Cox & Wilson, 1981).

Rist (1973) claimed that homogeneous grouping had significant effects on academic achievement with students in high ranking groups gaining an achievement advantage over students in low ranking groups by virtue of their group placement. Furthermore, Rist observed that teachers spent more instructional time and interacted more with students in higher groups. Tenth-grade students showed a significant correlation between academic achievement and track position (Schafer & Olexa, 1969).

The results of a research synthesis by Kulik and Kulik (1982) indicated that ability grouping had little significant effect on academic achievement except for high-ability students in honors classes. The differences that were found in grouped classes were all positive with no evidence of harmful effects from homogeneous grouping.

Heterogeneous students were outperformed slightly by homogeneous students. Pupils in gifted and talented programs achieved better gains than they would have in heterogeneous classes, but students in remedial classes or classes for the scholastically deficient performed neither better nor worse than they would have in heterogeneous classes (Kulik & Kulik, 1982).

A program for enrichment and acceleration in a junior high school utilized ability grouping to emphasize mathematics, science, reading, and social studies. Results of the program revealed that every experimental group was superior to all control groups. Furthermore, such a program engendered a school atmosphere in which the average students gained academically (Cobain & Ford, 1963).

Test scores of high-ability fourth-grade students showed a significant academic gain after one year of homogeneous grouping. Students who had scored a little above the criterion cutoff score used for placement in high- and regular-ability groups showed a performance increase, while students who had scored below the criterion showed a decrease after one year in regular-ability classes (Abadzi, 1984).

The performance of the highest and lowest students seemed to be unaffected by grouping, but students near the cutoff showed significant changes following homogeneous grouping. Regular students did not benefit academically by being homogeneously grouped (Abadzi, 1984).

Rowan and Miracle (1983) analyzed the effects of ability grouping on student achievement using data on urban fourth-grade students. Reading groups tended to disadvantage lower ability students who were in cross-classroom (interclass grouping) groups but enhanced lower ability students in within-classroom (intra-class grouping) groups. Students in higher groups received an achievement advantage over pupils in lower groups by virtue of their classification. They found that the pace of instruction was affected by group assignment and that this affected reading achievement.

The Alaska School Effectiveness Project concluded that high-ability children should be grouped together and that lower-ability children should be grouped with higher-ability children (Cotton & Savard, 1981). In another study, gifted children who were underachievers in Grades 2 through 5 were grouped either

homogeneously or heterogeneously. Results of the groupings showed that underachieving gifted students who had been placed in homogeneous groups made significant gains in approaching their expected levels of academic performance (Karnes, 1962).

The effects of ability grouping on third-grade students indicated that the higher the mean ability level of a class, the greater the gains of students in mathematics but the smaller the gains in reading. Homogeneous grouping was not found to have a significant effect on achievement gains in either math or reading (Leiter, 1983). Leiter further found no significant correlations between classroom racial and gender compositions and achievement.

Research by Cates and Ash (1983) revealed that although black students, with regard to ability group assignments and promotion and retention, did not experience as much positive effect as white students, both appeared to appreciably benefit from a promotional system relying on achievement. Black high-school and junior-high-school students who were arbitrarily moved up to the next higher ability group achieved higher scores on standardized tests than those who were retained in their original groups (Tuckman & Bierman, 1971).

The reading achievement of first-grade students who had been grouped according to sex and the experimental group exceeded the performance of those in control groups. Females had significantly higher means than the males in the same group. Sex grouping appeared to be slightly advantageous for males but detrimental to the achievement of females (Wyatt, 1965). Research on sex-segregated groups for first-grade reading instruction indicated

no significant achievement gains for males who were grouped together over those in heterogeneous sex groups, but that the achievement of females was significantly better than that of boys (Stanchfield, 1970).

The reading and spelling achievement of third-grade pupils was tested after they had received initial instruction linguistically and with a basal reader. The classes were divided into three ability levels and the results clearly favored the females who scored significantly higher than the males on the spelling subtest and writing sample measures (Schneyer, 1969).

A study of student grouping in Israeli schools cited the loss for low-ability students in homogeneous socio-learning environments as greater than the gain for high-ability students. While grouped heterogeneously, the loss for high-ability students was smaller than the gain for low-ability students (Dar & Resh, 1981).

The effects of interage grouping of elementary students were not significant on reading achievement between experimental and control groups (Yerry and Henderson, 1964). Oliver (1970) declared that homogeneous grouping in reading does not necessarily afford students greater achievement gains. Primary students whose reading test scores were compared significantly favored the multi-age group of first-grade students when compared to the homogeneous age group of students. There was no significant gain for students in Grades 2 and 3 (Mobley, 1977). Other studies also found no significant differences in academic achievement in groupings for primary students (Cartwright & McIntosh, 1972).

The reading achievement of handicapped students in Grades 7 and 8 was examined after they were placed in a remedial program, a resource room, or a regular classroom. There were no significant differences among the three groups (Bartolf, 1980).

Flexible grouping plans and a three-group achievement plan for fourth-grade students also revealed no significant differences in achievement. The flexible plan included the level of reading achievement, instructional needs, social and psychological needs, and considerations about group size while the three-group plan was based on achievement. Although there was no statistical difference between them, Eberwein (1972) commented that the latter plan was easier to implement and manage.

Doucette and St. Pierre (1977) reported that I.Q., race or ethnicity, primary language, and the diagnosis of reading problems were significantly correlated to reading achievement, but found that ability grouping and class size were not related to reading achievement for fifth-grade students.

Summary

Ability grouping evolved from the graded schools by the beginning of the 20th century. Controversy related to the educational benefits of homogeneous and heterogeneous instructional grouping ensued and studies were subsequently conducted. Criteria for placing students in ability groups included teacher recommendations, intelligence scores, past achievement, and reading comprehension test scores. Furthermore, ethnicity and socioeconomic status often influenced the assignment of pupils to groups.

Some research claimed that students who were placed in high groups tended to receive more warmth, attention, and praise from teachers than those students assigned to low groups. High-ability students used more supplemental materials and were offered instruction in conceptual learning and individual projects while low-ability students concentrated more on basic facts and drill work.

Other research contended that low-ability pupils received more instructional time than average- or high-ability students. They were also more likely to be placed in smaller classes than their peers and, therefore, were subject to more learning and instructional strategies, individual attention, and positive teacher and student attitudes.

Social status was reflected in the hierarchy of the groups' social status increased as one ascended to higher reading groups. Self-concepts of students reportedly improved when homogeneous grouping occurred; however, there were studies which contended that low-ability students were the least likely to benefit while high-ability students were the most likely to benefit. There were claims that homogeneous instructional groupings produced no obvious positive or negative effects and there were counterclaims that such grouping practices had significant effects on academic achievement.

There were indications that high-ability groups made gains and that homogeneous groups outperformed heterogeneous groups. Some studies contradicted claims that average- and low-ability students showed significant losses from homogeneous groupings. Both lower- and higher-ability students were found to achieve higher when placed in higher-ability classes.

Although there is research available to support either homogeneous or heterogeneous instructional grouping practices, the issue of improving schools which already score above the national norm on standardized reading achievement tests needs to be addressed. The possibility of making academic gains in a school system which already has supportive parents, effective teachers and administrators, and motivated students exists if administrators provide leadership which employs research in instructional decision making. This study deals with providing a means for every school with a similar population an opportunity to explore and implement appropriate grouping techniques without requiring major additional expenditures.

CHAPTER III

METHODOLOGY

Research Design

This study measured, by means of statistical analysis, the effects of administrator implemented homogeneous and heterogeneous instructional grouping techniques on reading comprehension standardized test scores. The study was conducted within schools in the Penn-Harris-Madison School Corporation in Indiana.

The description and identification of the educational setting, school population, subjects, instrumentation, and research procedures are described in this chapter. General statements of hypotheses from Chapter II are also restated in the null form.

The Educational Setting, Population, and Subjects

The Setting

The study was conducted in the Penn-Harris-Madison School Corporation in northern Indiana. The school corporation covers approximately 155 square miles with the northern boundary along the Michigan state line, the eastern boundary along the Elkhart County line, the southern boundary along the Marshall County line, and the western boundary along the Harris township line, the Madison township line, the city of Mishawaka and Ironwood Road south of the St. Joseph River.

School Population

One high school, two middle schools, and seven elementary schools are in the school corporation. The enrollment for students in Grades K through 6 was approximately 3,150. The middle schools enrolled about 1,700 students, and the high school had an average daily attendance of about 1,500 pupils.

Over 99 percent of the school corporation population was composed of white students. The elementary schools reflected such proportions also. The schools that were selected for this study reported that only about 1 percent of their students were participants in the free or reduced lunch program. The schools also historically scored above the national norm in reading achievement or standardized test scores.

Selection of the Subjects

In an effort to determine the effectiveness of administrator-implemented instructional-grouping practices, two schools were selected. One school fully utilized homogeneous grouping techniques and the other relied on traditional heterogeneous grouping practices. Selected students were those pupils who had been enrolled for at least three consecutive years in their respective schools. The students were also those who were identified as regular students. Pupils who received special school services such as Learning Disability and Educationally Handicapped assistance were not included in the study.

All students received instruction based upon the objectives outlined in the curriculum guides for the school corporation.

Differences in instruction occurred, however, when students who were grouped homogeneously were able to receive instruction prescribed as more appropriate for their needs, rather than being restricted to the grade-level materials.

Since the homogeneously grouped students had somewhat different reading instruction, they were considered as a treatment group. The heterogeneous group was considered the control group since their reading instruction was more traditional. The treatment students in the high-ability classes were offered above-grade-level basal textbooks and supplementary materials for enrichment. The homogeneously grouped students of average ability used grade-level materials as did their counterparts who were heterogeneously grouped. Both groups used supplementary materials in addition to the basal textbook.

The low-ability students who were heterogeneously grouped used numerous below-grade-level basal textbooks and supplementary materials to meet their needs. The low-ability heterogeneous group used materials to supplement their grade-level basal textbook for reading instruction. Neither the students nor the teachers were cognizant that they were to be control or experimental subjects.

The homogeneous group consisted of 113 sixth-grade students. Although there were more students in the sixth grade, a number of them did not meet the criteria for the consecutive years of instruction in that particular school; therefore, they were excluded in the data collection and analysis. The same was true

for the students in the control group, which consisted of 59 sixth-grade pupils.

The treatment group involved five different teachers each year. All teachers had experience and were on tenure. The control group received instruction from two different teachers during each year of the study. Those teachers, too, were experienced and on tenure. Minority percentages in the treatment group were under 1 percent and were zero in the control group.

The pupil-teacher ratio for reading instruction averaged 29.6 for the treatment group during their sixth-grade year. The high-ability group contained 34 students. The low-ability group contained 22 pupils, and the three average-ability groups had an average class size of 29.3 students. The control group averaged 29.5 students per teacher in the sixth grade year.

There was no reason to believe that the homogeneous and heterogeneous school populations were not relatively equivalent. However, to be sure of this, the Science Research Associates, Inc., Reading Comprehension Achievement Tests and the Science Research Associates, Inc., Educational Ability Series (EAS) were used as covariates to make appropriate adjustments in the statistical analysis of the data.

Instrumentation

Common measurement instruments with both the control and treatment groups included The Science Research Associates Achievement Series. The sections which measured intelligence and

reading comprehension were "The Educational Ability Series" and "Reading Comprehension," respectively.

"The Educational Ability Series measures those factors most closely associated with overall academic performance verbal, number, and reasoning abilities. It provides an estimate of general learning ability for students in grades K-12" (SRA Achievement Series, 1979 p. 24). "The Educational Ability Series" tests "a student's knowledge of vocabulary by giving a word stimulus and four choices." The student is then supposed to select the choice which most nearly means the same as the stimulus. Word groupings test a pupil's "ability to find one word in four that does not belong with the others" (p. 25).

The items from the section on Number and Series "deal with arithmetic computation and letter patterns. Some are computation, some determine how well a student can follow a pattern in a series of letters" (p. 25).

Spatial items "test a student's ability to visualize the relations of one shape to another. In upper levels (including grades 4-6) students are required to visually put together pieces to identify which one of four pieces can be formed" (p. 25).

"Reading Comprehension" tests students in Grades 4-6 "by giving a passage of information followed by a group of items directly related to the passage but not presuming previous knowledge. Students are required to read the passage and answer items in the following skill areas:

1. Grasping details. Questions ask for details stated in the passage although not stated in exactly the same words.

2. Summarizing. Questions test the students' ability to determine the main idea of a passage and to choose an appropriate title. Each distracter is a significant detail of the passage, but the correct answer summarizes the whole passage.

3. Drawing conclusions. Questions test a student's ability to comprehend implied information, such as a character's emotion, as well as to predict outcomes. Distracters are plausible, but only the correct answer is the logical conclusion.

4. Perceiving relationships. Three objectives fall in this heading: cause and effect, sequence, and comparison and contrast. In cause and effect, students read questions starting with why and responses begin with because. For sequence, students must recognize the proper sequence in a passage, the order of which depends on the passage, not on common sense. For comparison, students are required to compare and contrast material in a passage.

5. Understanding the author. These items test a student's ability to make judgments about an author's purpose, opinion, and style. For purpose and opinion items, the information is implied and should be clear to a skilled reader. The author's technique and style are judged by testing the understanding of literary devices such as personification and hyperbole" (p. 35).

Since the Achievement Series for reading comprehension and the Educational Ability Series (EAS) were standardized at the same time, with the same national sample, and since the norms developed for EAS are grade-based, Reading Achievement and EAS results can be compared (p. 26).

The Research Design

The design used was the Nonequivalent Control Group Design developed by Campbell and Stanley (1963, p.47).

Group	Pretest	Treatment	Posttest
Experimental Group	T	X	T
Control Group	T		T

The design is more effective when the experimental and the control groups are similar on their scores on the pretest. The advantages of this design were that no disruptive changes were implemented in the curriculum and individual classes were not disrupted in any manner. The subjects were not aware that this study was being contacted. The results were ex post facto since teachers were not aware of the study either.

Procedure

Fourth-grade students in two schools were administered the Standard Research Associates Achievement Reading Comprehension Test and Educational Ability Series tests in the spring of the school academic year. Two years later, when those students were in Grade 6, they were administered the grade appropriate tests from the same publisher. The fourth-grade test served as the pretest and the sixth-grade test served as the posttest.

Students in the control group were randomly placed in heterogeneous reading classes. Students in the experimental group were assigned on the basis of I.Q. and reading achievement scores, with teacher recommendations influencing the assignment of a few students and supporting the others.

Students in the control group received instruction with

common materials, which were grade level in nature, in heterogeneous classes through Grades 5 and 6. Students in the experimental group received instruction with materials appropriate to their reading achievement either above grade level, at grade level, or below grade level. All textbooks and materials were those which were "adopted" and approved by the school corporation.

Null Hypotheses

1. There is no significant difference between the means of homogeneously grouped high-ability sixth-grade students and heterogeneously grouped high-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test.

2. There is no significant difference between the means of homogeneously grouped average-ability sixth-grade students and heterogeneously grouped average-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test.

3. There is no significant difference between the means of homogeneously grouped low-ability sixth-grade students and heterogeneously grouped low-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test.

4. There is no significant difference between the means of homogeneously grouped high-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

5. There is no significant difference between the means of homogeneously grouped average-ability sixth-grade male and female

students as measured by the Science Research Associates Reading Achievement Test.

6. There is no significant difference between the means of homogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

7. There is no significant difference between the means of heterogeneously grouped high-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

8. There is no significant difference between the means of heterogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

9. There is no significant difference between the means of heterogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

Tests of Hypotheses

This is a quasi-experimental study using parametric techniques. The tests for the hypotheses were analysis of variance, analysis of covariance, and multiple linear regression in accordance with the BMDP computer programs.

P1R: Multiple Linear Regression

The P1R (Dixon & Brown, 1979) estimates a least squares regression equation between a dependent (predicted) variable and

one or more independent (predictor) variables. The computations are performed on all the data and, if requested, on subsets or groups of cases (p.380).

The equality of regression lines across groups is tested. The multiple correlation coefficient, standard error of an estimated value, standardized and unstandardized regression coefficients, significance of coefficient, and p values are printed. Data, residuals, and predicted values can be plotted in several ways and can be saved on a BMDP file (pp. 380-383).

Let y represent the value of the dependent variable and x_1, x_2, ..., x_p the values of the independent variables. P1R estimates by least squares the coefficients B_1, B_2, . . . , B_p in the equation

$$y = \alpha + B_1 x_1 + B_2 x_2 + \ldots + B_p x_p + \varepsilon$$

where ε represents the error. That is, it finds a, b_1, b_2, ..., b_p (the estimates of α, B_1, B_2, ..., B_p) that minimize

$$\Sigma\ (y - a - b_1 x_1 - b_2 x_2 - \ldots - b_p x_p)^2$$

where the summation is over the cases used in the analysis. When case weights are specified,

$$\Sigma\ w(y - a - b_1 x_1 - b_2 x_2 - \ldots - b_p x_p)^2$$

is minimized, where w is the case weight (p. 381).

P2V: Analysis of Variance and Covariance

The P2V performs an analysis of variance or covariance for models with equal or unequal cell sizes (Dixon, 1971, p. 540). Covariates are assumed to be linearly related to sixth-grade reading achievement.

The independent variables in this study are the instructional grouping treatments and sex. The dependent variables are the resulting scores on the reading comprehension and Educational Ability Series tests of Science Research Associates, Inc. The constant is consecutive years of instruction in the same school. The design for this experiment is the nonequivalent control group design. It was used to obtain results which would not be disruptive to the educational process of the subjects. The level of significance for the hypotheses is alpha = .05.

Assumptions

The following assumptions are made for the analysis of variance and covariance.

1. The sample is a representative sample of the homogeneous and heterogeneous reading groups of students in the Penn-Harris-Madison School Corporation.

2. The scores of the dependent variable are measured on an interval scale.

3. The population distributions are normal.

Summary

The primary purpose of this study was to examine the effects of administrator implemented homogeneous and heterogeneous grouping on the reading achievement of selected sixth-grade students. This study is a quasi-experimental study using the nonequivalent control-group design. The analysis compares the reading comprehension achievement of an experimental group and a

control group. It also compares the interaction of sex as a factor in reading achievement due to instructional grouping techniques.

CHAPTER IV

RESULTS OF THE STUDY

This chapter reports the results of the analysis of data concerning the effects of instructional grouping techniques with a sample of sixth-grade students in the Penn-Harris-Madison School Corporation. The treatment group was compared with a control group drawn from two schools within the northern Indiana public school system. The growth scale value scores of all students participating in the research are included in Appendix A. This chapter is organized to present the results of analysis of data for each of the hypotheses which were tested. A discussion of these results is presented in Chapter V.

This was a quasi-experimental study using parametric techniques. The tests for the hypotheses were analysis of variance, analysis of covariance, and multiple linear regression in accordance with the BMDP computer programs (Dixon & Brown, 1979).

The hypotheses were tested through the application of analysis of variance procedures to the appropriate data. All hypotheses were stated in the null form. A statistical significance level of alpha = .05 was used as the rejection criterion for the null form of the hypotheses. The nine hypotheses were grouped into sets of three for the purpose of interpreting the results.

The explanatory variable in the first three hypotheses was the instructional approach--homogeneous or heterogeneous. The impact of instructional approach on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the first three hypotheses.

The explanatory variable in the second group of three hypotheses was gender. All of the data tested in these hypotheses were applicable to subjects who were exposed to homogeneous instructional grouping methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

The explanatory variable in the last three hypotheses was also gender. All of the data tested in these hypotheses, however, were applicable to subjects who were exposed to heterogeneous instructional grouping methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

Mean sixth-grade reading scores for each of the 18 subject (student) groupings which were tested in the nine hypotheses are presented in Table 1. The results of the hypothesis testing are presented separately for each group of three hypotheses. Analysis of variance summary data are presented for each of the nine hypotheses.

TABLE 1

GROUP MEANS: SIXTH-GRADE READING SCORES ON THE SCIENCE RESEARCH ASSOCIATES READING COMPREHENSION TEST

Reading Group Level	Gender	Instructional Approach: Homogeneous	Instructional Approach: Heterogeneous
High Ability	Male	385.96	405.64
	Female	391.79	386.43
	All	388.37	398.17
Average Ability	Male	342.42	364.50
	Female	347.94	351.00
	All	344.77	357.19
Low Ability	Male	293.82	321.29
	Female	321.38	308.67
	All	308.75	317.50

Impact of Instructional Approach and Reading Ability Group on Sixth-Grade Reading Scores

Three hypotheses were tested in the assessment of the impact on sixth-grade reading scores of instructional approach and reading ability group. The explanatory variable in each of the hypotheses was the instructional approach--homogeneous or heterogeneous. The impact of instructional approach on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability,

(2) average ability, and (3) low ability. One ability group was tested in each of the first three hypotheses.

Hypothesis One

Hypothesis one was stated as follows: There is no significant difference between the means of homogeneously grouped high-ability sixth-grade students and heterogeneously grouped high-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 2.

TABLE 2

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES FOR HIGH-ABILITY SUBJECTS BY INSTRUCTIONAL APPROACH

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Instructional Approach	1,154.87	1	1,154.87	0.508
Residual	140,763.08	62	2,270.37	
Total	141,917.95	63		

The sixth-grade reading score mean for high-ability subjects exposed to heterogeneous instruction of 398.17 was higher than the 388.37 for subjects exposed to homogeneous instruction. As the results of the analysis of variance indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypotheses. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. The instructional approach does not significantly affect tne sixth-grade reading scores of high-ability reading group students.

Hypothesis Two

Hypothesis two was stated as follows: There is no significant difference between the means of homogeneously grouped average-ability sixth-grade students and heterogeneously grouped average-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 3.

TABLE 3

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES FOR AVERAGE-ABILITY SUBJECTS BY INSTRUCTIONAL APPROACH

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Instructional Approach	2,078.77	1	2,078.77	1.475
Residual	87,353.29	62	1,408.92	
Total	89,432.06	63		

The sixth-grade reading score mean for average-ability subjects exposed to heterogeneous instruction of 357.19 was higher

than the 344.77 for subjects exposed to homogeneous instruction. As the results of the analysis of variance indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. The instructional approach does not significantly affect the sixth-grade reading scores of average-ability reading group students.

Hypothesis Three

Hypothesis three was stated as follows: There is no significant difference between the means of homogeneously grouped low-ability sixth-grade students and heterogeneously grouped low-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 4.

TABLE 4

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES FOR LOW-ABILITY SUBJECTS BY INSTRUCTIONAL APPROACH

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Instructional Approach	1,801.47	1	1,801.47	0.995
Residual	76,027.18	42	1,810.17	
Total	77,828.65	43		

The sixth-grade reading score mean for low-ability subjects exposed to heterogeneous instruction of 317.50 was higher than the 308.75 for subjects exposed to homogeneous instruction. As the results of the analysis of variance indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. The instructional approach does not significantly affect the sixth-grade reading scores of low-ability reading group students.

Instructional Approach/Reading Ability Group Summary

Each of the three null hypotheses in this group was retained. Therefore, regardless of reading group ability level, it was found that academic performance, as measured by sixth-grade reading scores, was not affected to a statistically significant degree by either a homogeneous or heterogeneous instructional approach.

Impact of Gender and Reading Ability Group on Sixth-Grade Reading Scores of Subjects Exposed to Homogeneous Instruction

Three hypotheses were tested in the assessment of the impact of gender and reading ability group on the sixth-grade reading scores of subjects exposed to homogeneous instruction. The explanatory variable in each of these three hypotheses was gender. All of the data tested in these hypotheses were applicable to subjects who were exposed to homogeneous instructional methods. The impact of gender on sixth-grade reading scores was tested separately for three

reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

Hypothesis Four

Hypothesis four was stated as follows: There is no significant difference between the means of homogeneously grouped high-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 5.

TABLE 5

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR HIGH-ABILITY SUBJECTS RECEIVING HOMOGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	305.29	1	305.29	0.120
Residual	111,769.52	44	2,540.22	
Total	112,074.81	45		

The sixth-grade reading score mean for high-ability female subjects of 391.79 was higher than the 385.96 for high-ability male subjects. As the results of the analysis of variance indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. Gender does not significantly affect the sixth-grade reading scores of high-ability reading group students exposed to homogeneous instruction.

Hypothesis Five

Hypothesis five was stated as follows: There is no significant difference between the means of homogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 6.

TABLE 6

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR AVERAGE-ABILITY SUBJECTS RECEIVING HOMOGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	320.85	1	320.85	0.190
Residual	68,961.57	41	1,681.99	
Total	69,282.42	42		

The sixth-grade reading score mean for average-ability female subjects of 347.94 was higher than the 342.42 for average-ability male subjects. As the results of the analysis of variance

indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. Gender does not significantly affect the sixth-grade reading scores of average-ability reading group students exposed to homogeneous instruction.

Hypothesis Six

Hypothesis six was stated as follows: There is no significant difference between the means of homogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 7.

TABLE 7

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR LOW-ABILITY SUBJECTS RECEIVING HOMOGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	4,500.97	1	4,500.97	6.814*
Residual	14,532.01	22	660.55	
Total	19,032.98	23		

*Statistically significant at alpha = .05.

The sixth-grade reading score mean for low-ability female subjects of 321.38 was higher than the 293.82 for low-ability male subjects. As the results of the analysis of variance indicated, this difference was statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was by inference, rejected. Gender is significantly related to the sixth-grade reading scores of low-ability reading group students exposed to homogeneous instruction. Females scored significantly higher than males.

Gender/Reading Ability Group Summary: Homogeneous Instruction

The hypotheses applicable to both high ability and average-ability students were retained. The hypothesis applicable to low-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the sixth-grade reading scores of students exposed to homogeneous instruction was not consistent.

Impact of Gender and Reading Ability Group on Sixth-Grade Reading Scores of Subjects Exposed to Heterogeneous Instruction

Three hypotheses were tested in the assessment of the impact of gender and reading ability group on the sixth-grade reading scores of subjects exposed to heterogeneous instruction. The explanatory variable in each of these three hypotheses was gender. All of the data tested in these hypotheses were applicable to subjects who were exposed to heterogeneous instructional methods.

The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

Hypothesis Seven

Hypothesis seven was stated as follows: There is no significant difference between the means of heterogeneously grouped high-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 8.

TABLE 8

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR HIGH-ABILITY SUBJECTS RECEIVING HETEROGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	1,570.65	1	1,570.65	0.863
Residual	29,118.38	16	1,819.09	
Total	30,869.03	17		

The sixth-grade reading score mean for high-ability male subjects of 405.64 was higher than the 386.43 for high-ability female subjects. As the results of the analysis of variance indicated, however, this difference was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. Gender does not significantly affect the sixth-grade reading scores of high-ability reading group students exposed to heterogeneous instruction.

Hypothesis Eight

Hypothesis eight was stated as follows: There is no significant difference between the means of heterogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 9.

TABLE 9

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR AVERAGE-ABILITY SUBJECTS RECEIVING HETEROGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	4,534.88	1	4,534.88	5.183*
Residual	16,621.09	19	874.79	
Total	21,155.97	20		

*Statistically significant at alpha = .05.

The sixth-grade reading score mean for average-ability male subjects of 364.50 was higher than the 351.00 for average-ability

female subjects. As the results of the analysis of variance indicated, this difference was statistically significant at alpha = .05.

Based on the results of the analysis of variance, the null form of the hypothesis was rejected. Therefore, as the hypothesis was stated in the null form, it was, by inference, rejected. Gender is significantly related to the sixth-grade reading scores of average-ability reading group students exposed to heterogeneous instruction. Males scored significantly higher than females.

Hypothesis Nine

Hypothesis nine was stated as follows: There is no significant difference between the means of heterogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. The results are presented in Table 10.

TABLE 10

ANALYSIS OF VARIANCE OF SIXTH-GRADE READING SCORES BY GENDER FOR LOW-ABILITY SUBJECTS RECEIVING HETEROGENEOUS INSTRUCTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Gender	694.31	1	694.31	0.183
Residual	68,289.93	18	3,973.89	
Total	68,984.24	19		

The sixth-grade reading score mean for low-ability male subjects of 321.29 was higher than the 308.67 for low-ability female

subjects. As the results of the analysis of variance indicated, this difference based on gender was not statistically significant at alpha = .05.

Based on the results of the analysis of variance, it was not possible to reject the null form of the hypothesis. Therefore, as the hypothesis was stated in the null form, it was, by inference, retained. Gender does not significantly affect the sixth-grade reading scores of low-ability reading group students exposed to heterogeneous instruction.

Gender/Reading Ability Group Summary: Heterogeneous Instruction

The hypotheses applicable to both high-ability and low-ability students were retained. The hypothesis applicable to average-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the sixth-grade reading scores of students exposed to heterogeneous instruction was not consistent. Although an inconsistent assessment resulted with respect to students who were exposed to homogeneous instructional grouping practices, an exception was that homogeneously grouped low-ability females scored higher than homogeneously grouped low-ability males. The results were also inconsistent in regard to heterogeneous instructional grouping practices, with the exception being that heterogeneously grouped average-ability males scored higher than heterogeneously grouped average-ability females.

Analysis of Data: P1R

In the program control information only the REGRESS information is specific to P1R. For this study, the sixth-grade

reading scores were the dependent variable, while IQ and fourth-grade reading scores were independent variables.

The model fitted by PlR was $Y = a + b_1X_1 + b_2X_2 + \ldots b_pX_p + \varepsilon$ where

Y was the dependent variable

$X_1, \ldots, X_p$ were the independent variables

$b_1, \ldots, b_p$ were the regression coefficients

a was the intercept

i was the number of independent variables

was the error with mean zero.

The predicted value y for each case was

$Y = a + b_1X_1 + b_2X_2 + \ldots b_pX_p$.

Six variables were used in the multiple linear regression:

1. Ability group (high, average, and low)
2. Intelligence quotient (as defined by the Educational Ability Series)
3. Instructional grouping variables (1 if homogeneous; 2 if heterogeneous)
4. Gender (1 if male; 2 if female)
5. Fourth-grade reading score (according to the Science Research Associates Reading Achievement Test)
6. Sixth-grade reading score (according to the Science Research Associates Reading Achievement Test)

Only completed cases were used in the computations for Table 11. Therefore, only 172 cases were used, and all variables

TABLE 11

UNIVARIATE STATISTICS FOR EACH VARIABLE

Variable	Mean	Standard Deviation	Coefficient of Variation	Minimum	Maximum
Ability group	1.88368	.78612	.41733	1.00000	3.00000
Intelligence quotient	109.31337	16.28625	.14899	68.00000	144.00000
Homogeneous/ heterogeneous	1.34300	.47611	.35451	1.00000	2.00000
Gender	1.43601	.49733	.34633	1.00000	2.00000
Fourth-grade reading score	311.49048	49.06873	.15753	161.00000	445.00000
Sixth-grade reading score	355.35596	52.88350	.14882	206.00000	509.00000

were checked for invalid values. Univariate statistics were computed and are listed for each variable using the complete cases.

Below the univariate statistics in Table 12 the multiple correlation R between sixth-grade reading and two significant variables was printed (i.e., the correlation of the dependent variable with the two significant variables - IQ and fourth-grade reading). The analysis of variance for the regression was significant ($F(2,169) = 76.94$, $p < .01$).

TABLE 12

REGRESSION STATISTICS
FOR THE COMPARISON OF SIXTH-GRADE READING
ACHIEVEMENT AND I.Q. AND FOURTH-GRADE READING

Correlations	Coefficients
Multiple R	.6903
Multiple R Square	.4765
Standard Error Of Estimate	38.4887

A summary table for the regression was printed in Table 13. It contains:

1. The coefficient, b. The equation was

   $Y = 100.371 + X_1 + X_2$

   with Y representing sixth-grade reading; X_1 representing IQ; and X_2 representing fourth-grade reading.
2. The standard error of both coefficients, s(b).

3. Tolerance (1-R square) where the multiple R square was the correlation of independent variable i with the other independent variables.

TABLE 13

STATISTICS FOR THE SIGNIFICANT INDEPENDENT VARIABLES

	Intelligence Quotient	Fourth-Grade Reading
Coefficient	0.928970	0.492590
Standard error	0.257000	0.085000
Standardized regression coefficient	0.286000	0.457000
t test	3.618000	5.780000
Tolerance	0.495479	0.495479

The predicted values, the data, and the variables from IQ, Ability group, Homogeneous/heterogeneous, Gender, and fourth-grade reading scores were examined in plot paragraphs.

For the plot of the first predicted values for sixth-grade reading, the residuals $(Y' - Y)^2$ were plotted against the predicted values (estimates) Y'. The ability groups (high, average, and low) indicated a normal distribution, with an even distribution over the range of predicted reading scores, 280.0 - 437.5.

For the second plot of predicted values, the residuals squared $(Y' - Y)^2$ were plotted against the predicted values

(estimates) Y. The distribution again showed that the spread centered on zero residuals squared and the spread remained uniform through the range of scores.

The residuals (Y' - Y) were plotted against the observed values of the same independent variable (X_1) for IQ. The spread of points along the range of IQ scores showed a normal distribution, with the residual centering on zero.

For the plot of Homogeneous/heterogeneous groups, the observed and predicted values showed a normal distribution around zero for the spread of residual and the frequency (the number of occurrences).

A similar correlation was plotted for Gender, both in predicted and observed values and the residual values. The spread of the values, their frequency, and their centering showed a normal distribution.

For the plot of the predicted and observed values of fourth-grade reading scores and IQ, a consistency was revealed between observed and predicted values. A positive correlation between the predicted and observed values were in line with predictions.

The plotting of the residual values of fourth-grade reading scores indicated a normal distribution throughout the range of fourth-grade reading values and an increased frequency at the residual value 0.0.

Analysis of Data: P2V

The P2V program was used for the analysis of variance and covariance.

In this study, sixth-grade reading was the dependent variable. The grouping factors were IQ group, Homogeneous/heterogeneous groups, and Gender. The covariates were IQ and fourth-grade reading. Therefore, six variables were used.

The number of cases equalled 172. Only cases containing acceptable values for all variables specified were used in the analysis. An acceptable value was a value that was not out of range.

In the group structure, the frequency of observations is found in Table 14. All twelve IQ groups--males and females in homogeneous and heterogeneous groups for high-, average-, and low-ability students--were examined. The range went from a low of 6 females in a low-ability heterogeneous group to a high of 27 males in a high-ability homogeneous group.

TABLE 14

SAMPLE SIZE FOR EACH SUBGROUP

Ability Group High Average Low	Homogeneous/ Heterogeneous	Gender Male Female	Frequency
High	Homo	Male	27
High	Homo	Female	19
High	Hetero	Male	11
High	Hetero	Female	7
Average	Homo	Male	24
Average	Homo	Female	19
Average	Hetero	Male	10
Average	Hetero	Female	11
Low	Homo	Male	11
Low	Homo	Female	13
Low	Hetero	Male	14
Low	Hetero	Female	6

The cell means, frequency, and standard deviations for the 12 IQ groups are listed in Table 15. For the first covariate (IQ), homogeneous males in a high-ability group scored higher than heterogeneous males, while heterogeneous females scored higher than homogeneous females. This pattern was repeated for average-ability groups--homogeneous males scored higher than heterogeneous males and heterogeneous females scored higher than homogeneous females. In the low-ability group, homogeneous males again scored higher than heterogeneous females, while homogeneous and heterogeneous females scored virtually the same. There were no significant differences between the respective groups that were compared.

TABLE 15

INTELLIGENCE QUOTIENT FOR EACH SUBGROUP

I.Q. Group	Homogeneous/ Heterogeneous	Gender	I.Q.	Standard Deviation
High	Homo	Male	127.18519	7.04402
High	Homo	Female	123.26316	5.41441
High	Hetero	Male	126.90909	6.60991
High	Hetero	Female	126.28571	7.45462
Average	Homo	Male	107.87500	5.29407
Average	Homo	Female	107.57895	5.53088
Average	Hetero	Male	106.30000	4.00139
Average	Hetero	Female	108.18182	5.40034
Low	Homo	Male	87.90909	7.27261
Low	Homo	Female	90.30769	6.04683
Low	Hetero	Male	84.14286	8.76933
Low	Hetero	Female	90.16667	9.06458

In Table 16, the data for the second covariate (fourth-grade reading) showed that high-ability heterogeneous male and female groups scored higher than high-ability homogeneous male and female groups. Average- and low-ability heterogeneous male groups scored higher than males in the homogeneous average- and low-ability groups, respectively. Females in the average-ability homogeneous group scored virtually the same as females in the average-ability heterogeneous group. The low-ability homogeneous female group scored higher than the low-ability heterogeneous female group. However, there were no significant differences between the respective groups that were compared.

TABLE 16

FOURTH-GRADE READING FOR EACH SUBGROUP

I.Q. Group	Homogeneous/ Heterogeneous	Gender	4th-Grade Rdg Means	Standard Deviation
High	Homo	Male	341.92593	37.01239
High	Homo	Female	353.00000	41.68133
High	Hetero	Male	364.09091	48.72875
High	Hetero	Female	360.57143	46.84320
Average	Homo	Male	297.70833	27.28988
Average	Homo	Female	304.73684	30.17696
Average	Hetero	Male	304.10000	55.08267
Average	Hetero	Female	304.54545	40.80285
Low	Homo	Male	257.09091	28.17252
Low	Homo	Female	269.07692	24.43516
Low	Hetero	Male	277.50000	28.23187
Low	Hetero	Female	262.16667	36.70104

For the dependent variable (sixth-grade reading), heterogeneously grouped males scored higher than homogeneously grouped males

in all three ability groups. Homogeneous females scored better than heterogeneous females in the higher group. Heterogeneously grouped average-ability females scored slightly higher than homogeneously grouped average-ability females. Homogeneously grouped low-ability females scored higher than females in low-ability heterogeneous groups. There were no significant differences between the respective groups that are compared in Table 17.

Heterogeneous males scored higher than homogeneous males in each respective group. Homogeneous females scored higher than heterogeneous females in the high-and low-ability groups, but heterogeneously grouped average-ability females scored higher than females in the homogeneous average-ability group. However, there were no significant differences between groups that were compared.

TABLE 17

SIXTH-GRADE READING FOR EACH SUBGROUP

I.Q. Group	Homogeneous/ Heterogeneous	Gender	6th-Grade Rdg Means	Standard Deviation
High	Homo	Male	385.96296	47.01758
High	Homo	Female	391.78947	52.29364
High	Hetero	Male	405.63636	38.33868
High	Hetero	Female	386.42857	45.92696
Average	Homo	Male	342.41667	39.67906
Average	Homo	Female	347.73684	40.71151
Average	Hetero	Male	364.50000	30.08968
Average	Hetero	Female	351.00000	33.23552
Low	Homo	Male	293.81818	27.87048
Low	Homo	Female	321.38462	28.41226
Low	Hetero	Male	321.28571	62.96327
Low	Hetero	Female	308.66667	48.89853

Sixth-grade reading achievement scores, adjusted for differences in intelligence and fourth-grade reading achievement scores, are reported in Table 18. Heterogeneous males scored higher than homogeneous males, but homogeneous females scored higher than heterogeneous females. However, there were no significant differences between the respective scores that were compared.

A second P2V program was run using only five variables. Here the dependent variable was sixth-grade reading; the grouping factors were IQ group, Homogeneous/heterogeneous groups, and Gender; and the covariate was fourth-grade reading. Again the group structure consisted of 12 classifications. The only difference between the first test and the second was that IQ was controlled in the first test in order to find differences in grouping.

In the cell means for the first covariate, the males in heterogeneous groups scored better than males in all three homogeneous groups. The high-ability female homogeneous group scored better than the high-ability female heterogeneous group. Homogeneous and heterogeneous females scored virtually the same in the average-ability groups. Homogeneously grouped low-ability females scored higher than the heterogeneously grouped low-ability females.

The standard deviations for the covariate produced a consistent result. The homogeneously grouped males and females fared better than heterogeneously grouped females in high-, average- and low-ability groups. A consistent result implied a smaller spread throughout the test. The results were the same as those listed in Table 18.

TABLE 18

ADJUSTED CELL MEANS FOR
SIXTH-GRADE READING

Homogeneous/ Heterogeneous	Gender	6th-Grade Reading
Homo	Male	350.86207
Homo	Female	356.66830
Hetero	Male	364.01755
Hetero	Female	351.58607

TABLE 19

CELL MEANS FOR SIXTH-GRADE READING

I.Q. Group	Homogeneous/ Heterogeneous	Gender	6th Grade Rdg Means	Standard Deviation
High	Homo	Male	385.96296	47.01758
High	Homo	Female	391.78947	52.29364
High	Hetero	Male	405.63636	38.33868
High	Hetero	Female	386.42857	45.92696
Average	Homo	Male	342.41667	39.67906
Average	Homo	Female	347.73684	40.71151
Average	Hetero	Male	364.50000	30.08968
Average	Hetero	Female	351.00000	33.23552
Low	Homo	Male	293.81818	27.87048
Low	Homo	Female	321.38462	28.41226
Low	Hetero	Male	321.28571	62.96327
Low	Hetero	Female	308.66667	48.89853

The dependent variable generated cell means (See Table 20). The heterogeneously grouped males scored higher than the homogeneously grouped males in all three ability groups. For females, the scores showed that high-ability homogeneous grouped females ranked higher than high-ability heterogeneously grouped females. The heterogeneously grouped females ranked higher than homogeneously grouped females in the average-ability groups, but homogeneously grouped females scored higher than heterogeneously grouped females in the low-ability groups.

For the standard deviation of the dependent variable (sixth-grade reading), heterogeneous males and females scored lower deviations than did homogeneous males and females from the cell means in high and average groups. Both females and males in homogeneous groups produced lower standard deviations than did heterogeneous males and females in the low-ability group. It would seem that all homogeneous groups would have lower standard deviations than corresponding heterogeneous groups.

An analysis of variance is listed for the dependent variable (sixth-grade reading) in Table 20. This analysis showed no significant differences germane to the study but did approach significance for the interaction between Heterogeneous/homogeneous and Gender. The significant differences which are listed for IQ and fourth-grade reading were expected.

TABLE 20

ANALYSIS OF COVARIANCE FOR SIXTH-GRADE READING

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Tail Probability	Beta Estimates
IQ	16340.49888	2	8170.24944	5.29	.0060	
Homogeneous/ heterogeneous	831.34962	1	831.34962	.54	.4642	
Gender	155.61161	1	155.61161	.10	.7513	
IQ (Hetero/homo)	890.41842	2	455.20921	.29	.7499	
IQ (Gender)	1778.45354	2	889.22677	.58	.5634	
Hetero/homo gender	3430.63320	1	3430.63320	2.22	.1381	
IQ--Hetero/ homo--gender	179.07227	2	89.53613	.06	.9437	
Fourth-grade reading	55483.62624	1	55483.62624	35.93	.0000	.50981
Error	245513.67567	159	1544.11117			

*Statistically significant at alpha = .05

The adjusted cell means for the dependent variable showed no significant differences but did indicate that homogeneous females had higher scores than heterogeneous females while heterogeneous males had higher scores than homogeneous males (Table 21).

TABLE 21

ADJUSTED CELL MEANS FOR SIXTH-GRADE READING

Homogeneous/ Heterogeneous	Gender	6th-Grade Reading
Homo	Male	353.64607
Homo	Female	356.34678
Hetero	Male	359.72769
Hetero	Female	351.36602

Next, a three-way analysis of covariance for Sixth-grade reading scores (Table 22) was used to control variables and interaction. The differences found in earlier tests were no longer significant because of the interaction of IQ, heterogeneous/homogeneous groups, gender, and Fourth-grade reading scores. This analysis was consistent with the results listed in Table 20 with the exception of IQ. The heterogeneous/homogeneous/gender grouping methods and IQ in Table 22 approach significance, but there were no other significant differences found. The second covariate of Fourth-grade reading scores was highly correlated with Sixth-grade reading scores, as would have been expected.

TABLE 22

ANALYSIS OF COVARIANCE FOR SIXTH-GRADE READING

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Tail Probability	Beta Estimates
IQ	670.88125	2	335.44063	.22	.8035	
Homogeneous/ heterogeneous	1077.82509	1	1077.82509	.70	.4028	
Gender	260.38520	1	260.38520	.17	.6806	
IQ (Hetero/homo)	1004.34571	2	502.17286	.33	.7209	
IQ (Gender)	910.85895	2	455.42948	.30	.7432	
Hetero/homo gender	4513.14150	1	4513.14150	2.95	.0880	
IQ--Hetero/ homo--gender	249.51918	2	124.75959	.08	.9218	
IQ	3562.85969	1	3562.85969	2.33	.1292	.78700
Fourth-grade reading	39438.33741	1	39428.33741	25.75	.0000	.46030
IQ and Fourth-grade reading	59046.48593	2	29523.24296	19.28	.0000	
Error	241950.81598	158	1531.33428			

Summary

Nine hypotheses were tested. The explanatory variable in the first three hypotheses was the instructional approach--homogeneous or heterogeneous. The impact of instructional approach on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the first three hypotheses.

Each of the three hypotheses in this group was supported by the analysis of variance results. Therefore, regardless of reading group ability level, it was found that academic performance, as measured by sixth-grade reading scores, was not affected to a statistically significant degree by the instructional approach--homogeneous or heterogeneous.

Specific results for the three tested hypotheses were:

1. There was no statistically significant difference at alpha = .05 between the means of homogeneously grouped high-ability sixth-grade students and heterogeneously grouped high-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test.

2. There was no statistically significant difference at alpha = .05 between the means of homogeneously grouped average-ability sixth-grade students and heterogeneously grouped average-ability sixth-grade students as measured by the Science Research Associates Reading Achievement Test.

3. There was no statistically significant difference at alpha = .05 between the means of homogeneously grouped low-ability sixth-grade students and heterogeneously grouped low-ability sixth-grade

students as measured by the Science Research Associates Reading Achievement Test.

The explanatory variable in the second group of three hypotheses was gender. All of the data tested in these hypotheses were applicable to subjects who were exposed to homogeneous instructional methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

Specific results for the three tested hypotheses were:

4. There was no statistically significant difference at alpha = .05 between the means of homogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

5. There was no statistically significant difference at alpha = .05 between the means of homogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test.

6. There was a statistically significant difference at alpha = .05 between the means of homogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Test. Females scored significantly higher than males.

The hypotheses applicable to both high-ability and average-ability students were supported by the analysis of variance results. The hypothesis applicable to low-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the

sixth-grade reading scores of students exposed to homogeneous instruction was not consistent. While the preponderance of the results indicated that gender did not have a significant impact on sixth-grade reading scores of students exposed to homogeneous instruction, there was an exception with respect to low-ability students, where female students performed significantly better than did male students.

The explanatory variable in the last three hypotheses was also gender. All of the data tested in these hypotheses, however, were applicable to subjects who were exposed to heterogeneous instructional methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

The hypotheses applicable to both high-ability and low-ability students were supported by the analysis of variance results. The hypothesis applicable to average-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the sixth-grade reading scores of students exposed to heterogeneous instruction was not consistent. While the preponderance of the results indicated that gender did not have a significant impact on sixth-grade reading scores of students exposed to heterogeneous instruction, there was an exception with respect to average-ability students, where male students performed significantly better than did female students.

Specific results for the three tested hypotheses were:

7. There was no statistically significant difference at alpha = .05 between the means of heterogeneously grouped high-ability

sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Tests.

8. There was a statistically significant difference at alpha = .05 between the means of heterogeneously grouped average-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Tests. Males scored significantly higher than females.

9. There was no statistically significant difference at alpha = .05 between the means of heterogeneously grouped low-ability sixth-grade male and female students as measured by the Science Research Associates Reading Achievement Tests.

Although an inconsistent assessment resulted with respect to students who were exposed to homogeneous instructional grouping practices, an exception was that homogeneously grouped low-ability females scored higher than homogeneously grouped low-ability males. The results were also inconsistent in regard to heterogeneous instructional grouping practices, with the exception being that heterogeneously grouped average-ability males scored higher than heterogeneously grouped average-ability females.

When the data were analyzed after controlling for variables and interaction was examined, the significant differences were no longer found. However, there was near significance in the grouping methods for gender.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The summary, conclusions, discussion, and recommendations of the study are presented in this chapter.

Summary

Literature

This study addressed itself to the reading achievement of the nation's students, a concern which has become increasingly prevalent among the nation's citizens in general. This concern was addressed in A Nation at Risk, which recommended that schools provide for better classroom manangement and organization of the school day in order to provide more time for pupil learning. A further recommendation advocated that placement and grouping of students be based upon academic progress and instructional needs of pupils.

While instructional grouping practices have been in existence since the beginning of this century, trends and controversy have ensued in regard to academic benefits. With renewed interest in achievement and recommendations by T. H. Bell's committee which were based on a definitive study of the nation's schools, further

research was conducted to examine methods to improve learning opportunities.

A number of studies are available which reveal conflicting opinions on the value of homogeneous and heterogeneous instructional grouping practices. High-ability students were claimed to experience better gains when grouped homogeneously rather than heterogeneously. Other studies indicated that average- and low-ability students sustained significant academic losses when grouped homogeneously.

Some research found that high-ability students who were grouped received more attention and praise than students in low groups. Other studies contended that low-ability pupils received more instructional time than their peers in average- or high-ability groups. They were also more likely to be placed in smaller classes and exposed to more instructional strategies, individual attention, and positive teacher and student attitudes. Improved self-concepts were reported for students when homogeneous grouping occurred; however, low-ability students were believed to be the least likely to benefit.

Because of conflicting results being reported in regard to the benefits of instructional grouping practices, this study was undertaken for the purpose of assessing the advantages or disadvantages in terms of relative student academic achievement, of grouping students in homogeneous and heterogeneous reading classes. The chief purposes were to determine whether students experienced higher academic reading gains when grouped in homogeneous or heterogeneous instructional groups. High-ability students, average-ability

students, and low-ability students were respectively compared in each group. There was also a comparison of gender scores for each type of group.

Sample and Design

In an attempt to assess the impact of administrator implemented homogeneous and heterogeneous instructional grouping techniques on academic achievement, 113 sixth-grade students in one school from Penn-Harris-Madison School Corporation, in northern Indiana, were chosen to represent the treatment which received reading instruction according to homogeneous groups. Fifty-nine other sixth-grade students in another school within the same school district composed the control group. The students had been enrolled in their respective schools since at least fourth grade. Less than 1 percent of the population of selected students were members of socio-economic or racial minorities.

The analysis of instructional approaches included the formulating and testing of nine hypotheses. The hypotheses were formulated in a way which permitted two potential intervening variables: (1) gender and (2) reading ability group classification.

The hypotheses were tested through the application of analysis of variance procedures to the appropriate data. All hypotheses were stated in the null form.

A statistical significance level of alpha = .05 was used as the rejection criterion for the null form of the hypotheses. The nine hypotheses were grouped into sets of three for the purposes of

results interpretation. The explanatory variable in the first three hypotheses was the instructional approach--homogeneous or heterogeneous. The impact of instructional approach on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the first three hypotheses.

The explanatory variable in the second group of three hypotheses was gender. All of the data tested in these hypotheses were applicable to subjects who were exposed to homogeneous instructional methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

The explanatory variable in the last three hypotheses was also gender. All of the data tested in these hypotheses, however, were applicable to subjects who were exposed to heterogeneous instructional methods. The impact of gender on sixth-grade reading scores was tested separately for three reading group levels: (1) high ability, (2) average ability, and (3) low ability. One ability group was tested in each of the three hypotheses.

The major findings of this study are expressed as follows:

1. There was no significant difference between the means of the sixth-grade reading scores for those high-ability students receiving homogeneous instruction and those receiving heterogeneous instruction.

2. There was no significant difference between the means of the sixth-grade reading scores for those average-ability students receiving homogeneous instruction and those receiving heterogeneous instruction.

3. There was no significant difference between the means of the sixth-grade reading scores for the low-ability students receiving homogeneous instruction and those receiving heterogeneous instruction.

4. There was no significant difference between the means of the sixtn-grade reading scores for those male high-ability students receiving homogeneous instruction and those female high-ability students receiving such instruction.

5. There was no significant difference between the means of the sixth-grade reading scores for those male average-ability students receiving homogeneous instruction and those female average-ability students receiving such instruction.

6. There was a significant difference between the means of the sixth-grade reading scores for those male low-ability students receiving homogeneous instruction and those female low-ability students receiving such instruction. Females scored significantly higher than males.

7. There was no significant difference between the means of the sixth-grade reading scores for those male high-ability students receiving heterogeneous instruction and those female high-ability students receiving such instruction.

8. There was a significant difference between the means of the sixth-grade reading scores for those male average-ability

students receiving heterogeneous instruction and those female average-ability students receiving such instruction. Males scored significantly higher than females.

9. There was no significant difference between the means of the sixth-grade reading scores for those male low-ability students receiving heterogeneous instruction and those female low-ability students receiving such instruction.

Conclusions

Based on the major findings of this study, it appears that there were virtually no significant differences between the academic achievement in reading for heterogeneously grouped students and homogeneously grouped students who are part of a school population which consists of over 99 percent white students and only about 1 percent who are participants in the free or reduced price lunch program. With students who have historically scored above the national norm in reading achievement on standardized test scores, there appear to be no major reading achievement differences for students who receive instruction in heterogeneous or homogeneous groups. However, there are implications that certain student groups benefit from heterogeneous or homogeneous grouping strategies for reading. Female students of low ability appear to benefit significantly more than male students of low ability when they receive homogeneous reading instruction. Male students of average ability appear to benefit significantly more than female students

of average ability when they receive heterogeneous reading instruction.

Discussion of the Results

The first group of three hypotheses assessed the impact of instructional approach--homogeneous or heterogeneous--on sixth-grade reading scores, with respect to the reading group ability level of the students. Each of the three hypotheses in this group was supported by the analysis of variance results. Therefore, regardless of reading group ability level, it was found that academic performance, as measured by sixth-grade reading scores, was not affected to a statistically significant degree by the instructional approach--homogeneous or heterogeneous.

These results are consistent with the conclusions of Goldberg, Passow, and Justman (1966), who found no obvious positive or negative effect on the average academic achievement of ability-grouped children. However, these findings refuted those of Findley and Bryan (1970), who found that high-ability groups made gains and that average- and low-ability groups showed significant losses.

Rowan and Miracle (1983) reported that homogeneously grouped high-ability students gained in achievement, as did Rist (1973) and Abadzi (1984). Underachieving gifted and talented students also made significant gains in approaching their expected levels of academic performance after being placed in homogeneous groups (Karnes, 1962).

The second group of three hypotheses assessed the impact of gender on the sixth-grade reading scores of students exposed to

homogeneous instruction, with respect to the reading group ability levels of the students. The hypotheses applicable to both high-ability and average-ability students were supported by the analysis of variance results. The hypothesis applicable to low-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the sixth-grade reading scores of students exposed to homogeneous instruction was not consistent. While the preponderance of the results indicated that gender did not have a significant impact on sixth-grade reading scores of students exposed to homogeneous instruction, there was an exception with respect to low-ability students, where female students performed significantly better than did male students. However, other related studies of reading achievement found no significant differences in academic achievement in groupings for primary students (Cartwright & McIntosh, 1972) and for gender compositions and achievement (Leiter, 1983).

The third group of three hypotheses assessed the impact of gender on the sixth-grade reading scores of students exposed to heterogeneous instruction, with respect to the reading group ability levels of the students. The hypotheses applicable to both high-ability and low-ability students were supported by the analysis of variance results. The hypothesis applicable to average-ability students, however, was rejected. Therefore, the assessment of the impact of gender on the sixth-grade reading scores of students exposed to heterogeneous instruction was not consistent. While the preponderance of the results indicated that gender did not have a significant impact on sixth-grade reading scores of students exposed

to heterogeneous instruction, there was an exception with respect to average-ability students, where male students performed significantly better than female students.

A related study of reading achievement of students grouped according to gender appeared to be slightly advantageous for males but detrimental to females (Wyatt, 1965). Findley and Bryan (1970) also supported heterogeneous grouping practices for average-ability students since they found that homogeneous grouping practices led to significant losses for average-ability students. Kelly (1972) found that intermediate male remedial students made significant gains due to homogeneous grouping practices. Kulik and Kulik (1982) indicated no significant differences were found for average-ability students in either homogeneous or heterogeneous reading classes. Regular students did not benefit academically by being in homogeneous groups according to Abadzi (1984).

Although an inconsistent assessment resulted with respect to students who were exposed to homogeneous instructional grouping practices, an exception was that homogeneously grouped low-ability females scored higher than homogeneously grouped low-ability males. The results were also inconsistent in regard to heterogeneous instructional grouping practices, with the exception being that heterogeneously grouped average-ability males scoring higher than heterogeneously grouped average-ability females.

The three hypotheses which dealt primarily with the impact on academic performance of the instructional approach to which students were exposed were deliberately stated in their null forms. An assumption was thus made that the results attained through the

application of the two instructional approaches would not result in statistically significant differences.

In this study, the impact of instructional approach on sixth-grade reading test scores was assessed with respect to students classified by their teachers into three reading level ability groups: (1) high, (2) average, and (3) low. With respect to each of the three ability levels, students exposed to heterogeneous instruction scored somewhat higher on the sixth-grade reading test than did students exposed to homogeneous instruction. The mean difference in scores approximated 3 percent; however, the differences were not statistically significant at alpha = .05 for any of the three ability groups.

With respect to gender, no assumptions were made with respect to superior performance expected by students of either sex. As was true with respect to instructional approach, the assumption made for this study with respect to gender was that it would not affect to a statistically significant degree the sixth-grade reading scores attained by students of similar reading group ability levels who had been exposed to similar instructional methods.

With respect to both male and female students exposed to homogeneous and heterogeneous instructional methods, the results of this study found that, in the majority of cases, gender had no statistically significant impact on the sixth-grade reading scores attained. With respect to each instructional method, however, there were exceptions to this general finding.

Females exposed to homogeneous instruction scored higher than did females exposed to heterogeneous instruction on the sixth-

grade reading test in the higher group, lower in the average group, and better in the low group. The mean difference between female and male students was somewhat in excess of 3 percent. For the high- and average-ability groups, however, the mean difference between males and females was only 1.5 percent. In the low-ability group, the difference between female and male students was a surprising (in light of the findings with respect to high- and average-ability students) 9.3 percent, which was a statistically significant difference.

Males exposed to heterogeneous instruction scored higher on the sixth-grade reading test in all three ability groups than did males exposed to homogeneous instruction. The mean difference between male and female students was somewhat in excess of 4 percent. However, the differences were not statistically significant with respect to the high- and low-ability groups. With respect to the average-ability group, however, the finding that reading test scores for males were higher than those for females among the students exposed to heterogeneous instruction was statistically significant.

When the data were analyzed for variables and interaction, there were no longer any significant differences found. However, there was near significance in the grouping methods for gender.

There are a number of possible reasons that the results were inconsistent with respect to students' reading achievement for homogeneous and heterogeneous instructional grouping practices. As the high-ability, average-ability, and low-ability groups were compared, there were no significant differences due to instructional

approach. This could have been due to the fact that the student populations were so similar. As indicated previously, there were virtually no students (only about 1 percent) who were eligible for free or reduced price lunches. The student populations were also virtually all (over 99 percent) the same race and had similar socioeconomic backgrounds. Furthermore, no pupils who received special services such as Learning Disability and Educationally Handicapped assistance were included in the research data.

In regard to teachers' experience, all of the teachers involved were experienced and had been working with this caliber of student for a number of years. Their expectations of the students, their knowledge of parents' expectations, and the goals of this caliber of student were familiar to teachers and undoubtedly affected their educational strategies, regardless of their use of homogeneous or heterogeneous instructional approaches. Since these teachers had been employed in the same school district for a number of years, it is assumed that they all attended and experienced similar staff development activities regarding student achievement, teacher effectiveness, and levels of expectations. Furthermore, all teachers were probably receiving about the same amount of guidance and supervision.

Another critical factor is that research shows that teachers prefer to teach the better readers (Miller & Hering, 1975) and these populations are overrepresented with better than average readers. This would affect teacher attitudes and could be crucial since the teacher has the greatest effect on academic achievement (Artley, 1981).

Since the student populations were similar in achievement and socio-economic background, there probably existed similarities in student motivation, self-concepts, and peer pressure to achieve. The role of parental interest, involvement, and impact would probably produce similarities if examined.

Another factor regarding instruction was that all students received instruction based upon the objectives outlined in the curriculum corporation guides. All students also used supplementary materials, in addition to basal readers, in order to have needs met.

In regard to administrator implementation of instructional grouping strategies, it is assumed that teachers were sanctioned to use their respective approaches for reading instruction. Therefore, leaders must have felt that the appropriate instructional grouping strategies were being employed according to teacher and student needs.

In regard to the significant differences which did occur (female low-ability students scored significantly higher than male low-ability students who were homogeneously grouped; and male average-ability students scored significantly higher than female average-ability students who were heterogeneously grouped), the sample sizes were rather small and these hypotheses of the study should be replicated with similar populations with much larger samples.

Recommendations

In this section ideas for further investigation are listed.

1. Further research should be conducted on similar populations with much larger samples.

2. Additional research should be conducted which includes a more diverse population of students. Racial and socio-economic factors should be examined. Underprivileged and culturally deprived students should be studied to determine which grouping methods offer them the best opportunities to learn.

3. Further research should be conducted regarding teacher effectiveness in homogeneous and heterogeneous instructional settings.

4. Further examination of teacher attitudes toward grouping methods and types of students should occur.

5. Student attitudes toward heterogeneous and homogeneous grouping methods should be analyzed.

6. The effect of grouping methods on motivation and academic achievement should be studied.

7. The effect peer pressure to achieve has on students in grouping situations should be explored.

8. Teacher methods, types of materials used, and the amount of class time for high-, average-, and low-ability students should be compared with academic achievement.

9. The impact of parental involvement and interest in their children's education and achievement should be reviewed.

10. The role of expectations of students, parents, teachers, and administrators should be examined to determine their importance in academic achievement.

11. Further research should be conducted regarding administrator effectiveness in homogeneous and heterogeneous instructional settings.

12. Further research should be conducted regarding administrator effectiveness in implementing, supervising, and evaluating educational programs.

APPENDIX

TREATMENT GROUP

Student	1-High 2-Average 3-Low Classification for Reading Group	I.Q.	1-Homo 2-Hetero Group	1-Male 2-Female Gender	Fourth Grade Growth Scale	Sixth Grade Growth Scale
1	1	123	1	2	445	427
2	2	125	1	2	292	331
3	1	120	1	2	320	341
4	3	91	1	1	280	331
5	2	114	1	1	296	270
6	1	128	1	1	305	376
7	1	119	1	2	292	362
8	3	91	1	2	292	336
9	2	110	1	2	277	427
10	2	127	1	1	300	369
11	1	123	1	2	375	376
12	2	130	1	2	375	403
13	3	102	1	2	326	321
14	3	102	1	2	230	287
15	2	109	1	1	300	326
16	3	112	1	2	288	326
17	1	112	1	2	375	362
18	1	123	1	1	310	356
19	1	128	1	1	423	427
20	1	127	1	2	404	384
21	1	127	1	1	346	414
22	2	102	1	1	338	341
23	2	114	1	1	320	308
24	2	97	1	2	305	341
25	3	99	1	2	277	291
26	2	105	1	1	315	362
27	1	120	1	2	326	384
28	2	115	1	1	326	384
29	2	122	1	2	404	326
30	3	120	1	2	320	403
31	2	112	1	1	305	362
32	2	98	1	1	236	287
33	2	132	1	1	354	369
34	2	105	1	1	271	362
35	2	112	1	1	284	441
36	2	106	1	1	300	341
37	2	123	1	1	296	283
38	1	119	1	1	338	441
39	2	94	1	2	300	346
40	3	88	1	2	256	331

TREATMENT GROUP--continued

Student	1-High 2-Average 3-Low Classification for Reading Group	I.Q.	1-Homo 2-Hetero Group	1-Male 2-Female Gender	Fourth Grade Growth Scale	Sixth Grade Growth Scale
41	2	112	1	2	288	392
42	1	134	1	1	338	403
43	3	91	1	2	277	308
44	2	105	1	2	262	376
45	2	119	1	2	375	427
46	2	110	1	1	338	376
47	2	91	1	2	292	308
48	2	120	1	1	326	312
49	2	115	1	1	284	321
50	2	94	1	2	256	326
51	3	88	1	1	262	312
52	2	119	1	2	332	336
53	2	103	1	2	310	326
54	2	109	1	1	310	356
55	2	112	1	1	300	326
56	3	75	1	1	253	299
57	2	106	1	?	338	346
58	1	127	1	1	375	376
59	3	92	1	2	256	312
60	2	120	1	1	315	441
61	1	141	1	1	364	441
62	1	128	1	2	310	369
63	3	94	1	1	274	336
64	2	106	1	2	326	356
65	1	144	1	1	388	403
66	1	117	1	2	364	491
67	2	115	1	2	326	356
68	3	99	1	1	284	265
69	1	122	1	1	364	362
70	3	88	1	1	230	259
71	1	132	1	1	423	509
72	1	130	1	1	300	376
73	1	120	1	1	364	392
74	1	132	1	2	305	384
75	3	93	1	1	310	283
76	2	106	1	1	288	326
77	2	115	1	2	346	362
78	3	99	1	1	217	308
79	2	101	1	2	315	331
80	2	123	1	1	332	369

TREATMENT GROUP--continued

Student	1-High 2-Average 3-Low Classification for Reading Group	I.Q.	1-Homo 2-Hetero Group	1-Male 2-Female Gender	Fourth Grade Growth Scale	Sixth Grade Growth Scale
81	2	98	1	2	271	321
82	2	107	1	2	310	376
83	1	119	1	2	364	457
84	2	99	1	1	292	299
85	2	128	1	1	271	376
86	3	109	1	1	288	346
87	2	102	1	2	305	321
88	1	132	1	1	364	392
89	3	109	1	2	271	275
90	1	130	1	2	354	427
91	2	117	1	1	332	312
92	2	93	1	1	268	270
93	2	85	1	2	277	384
94	3	85	1	2	230	270
95	2	128	1	1	326	392
96	2	115	1	1	346	414
97	1	122	1	1	326	369
98	3	93	1	2	256	308
99	2	110	1	1	277	351
100	2	102	1	2	262	287
101	2	107	1	1	274	331
102	2	102	1	1	277	346
103	3	78	1	1	224	275
104	3	80	1	1	217	259
105	2	103	1	1	315	356
106	1	141	1	1	338	336
107	2	89	1	1	274	321
108	3	117	1	2	292	291
109	1	107	1	2	296	414
110	1	117	1	2	375	414
111	1	119	1	1	326	441
112	1	134	1	2	375	473
113	1	127	1	1	388	384

CONTROL GROUP

Student	1-High 2-Average 3-Low Classification for Reading Group	I.Q.	1-Homo 2-Hetero Group	1-Male 2-Female Gender	Fourth Grade Growth Scale	Sixth Grade Growth Scale
114	1	127	2	1	288	356
115	2	115	2	2	271	336
116	3	97	2	2	209	351
117	3	99	2	2	320	341
118	3	85	2	1	277	321
119	3	85	2	1	274	346
120	1	130	2	1	388	351
121	2	102	2	1	354	384
122	3	68	2	1	246	303
123	2	105	2	2	296	351
124	1	134	2	1	445	491
125	1	127	2	1	388	414
126	3	98	2	1	305	206
127	2	115	2	2	332	376
128	2	112	2	1	338	427
129	1	120	2	2	404	376
130	1	136	2	1	364	384
131	3	80	2	1	259	376
132	3	86	2	1	292	376
133	2	110	2	1	332	356
134	3	78	2	2	271	287
135	3	83	2	1	241	227
136	2	107	2	2	354	427
137	3	78	2	1	230	303
138	1	136	2	2	332	376
139	1	132	2	2	404	384
140	2	109	2	2	346	351
141	3	92	2	1	326	384
142	3	83	2	1	310	441
143	3	92	2	1	284	321
144	1	119	2	1	332	392
145	1	117	2	1	280	414
146	2	109	2	1	338	392
147	2	101	2	2	256	317
148	1	130	2	2	364	414
149	1	117	2	1	364	414
150	2	110	2	2	280	326

CONTROL GROUP--continued

Student	1-High 2-Average 3-Low Classification for Reading Group	I.Q.	1-Homo 2-Hetero Group	1-Male 2-Female Gender	Fourth Grade Growth Scale	Sixth Grade Growth Scale
151	1	130	2	1	364	427
152	1	119	2	2	284	336
153	2	99	2	2	241	321
154	2	102	2	1	161	346
155	2	101	2	1	315	376
156	3	91	2	2	246	295
157	2	106	2	1	326	346
158	2	110	2	2	305	326
159	2	114	2	2	364	384
160	3	80	2	2	253	227
161	2	105	2	2	305	346
162	2	103	2	1	284	341
163	3	86	2	1	274	275
164	3	94	2	1	305	335
165	3	68	2	1	262	283
166	1	117	2	2	332	346
167	3	96	2	2	274	351
168	2	109	2	1	305	326
169	2	109	2	1	288	351
170	1	132	2	1	404	427
171	1	127	2	1	388	392
172	1	130	2	2	404	473

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